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CHEMOTHERAPY OF TUBERCULOSIS

RESEARCH DURING THE PAST 100 YEARS*

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PART I

Viewed historically, the conception of treatment in tuberculosis has been as complex and as changing as in any branch of medicine. Emphasis on it as a social disease, a hereditary stigma, a contagion, an inflammation, or a bacterial infection has determined the approach to treatment and prevention. In the present lecture I shall attempt to trace the historical development of the chemotherapeutic aspect of tuberculosis treatment, so that the physician, more particularly the non-specialist, may be helped to see in perspective the successes which, if not already in the foreground of the future, are perhaps no farther away than its middle distance. I shall aim to present this development in relation, on the one hand, to the tremendous advances in general chemotherapy, and, on the other, to the advances in the broad knowledge of tuberculosis and of its management and treatment; and I shall attempt to weave into the complex historical pattern the development of the use of antibiotic substances.

First, I must make clear how I propose to use the term "chemotherapy." Most revolutionary concepts are not static, and chemotherapy in the sense of Ehrlich, who first coined the word, is no exception. Conceived by him as a science which "treats of the action and mechanism of the effects of chemical substances upon cells, and especially of drugs upon disease-producing organisms" (see Kolmer, 1926), it has been restricted by some to artificially produced chemicals and expanded by others so as to include the pharmacotherapy of non-infective disease. All agree, however, that chemotherapy is to be differentiated from therapy by means of immune bodies or such microbial products as tuberculin, and that it excludes the chemical treatment of symptoms. I propose to follow Galdston (1940) and keep in mind the *objective* of chemotherapy given by one worker: "to destroy the parasites in the body of the host, or at least so to injure them that they will prove vulnerable to the host's own defensive powers," taking this definition to cover bacteriostatic as well as bactericidal action, and to imply the proviso of relative harmlessness to the host. I shall include, therefore, consideration of antimicrobial agents that are inorganic substances, that are purely synthetic organic compounds, and that are organic compounds obtained from natural or biological sources —e.g., those products of microbial origin now known as antibiotics,† even though relatively few of these last have been isolated, purified, and characterized, and fewer still fully understood structurally. Divisions are rather artificial here, for what is obtained from biological sources to-day may be synthesized in the chemical laboratory to-morrow, and series of related compounds may be made the week after. Too precise a definition of chemotherapy is unwise, for, as originally visualized by Ehrlich in the strict sense, it involves complete internal disinfection in the living body with one or two doses; but Ehrlich himself allowed this interpretation to be widened as a result of experience. Again, Ehrlich undoubtedly conceived throughout his life the effect of chemotherapeutic agents as being produced primarily by direct and specific action upon the invading organisms—though the host's tissues might oxidize, reduce, or otherwise convert an inactive drug to an active form. Yet there are instances where the action has been presumed to be wholly indirect—viz., stimulatory to the natural defensive mechanisms of the body (reticulo-endothelial system, etc.); such instances are properly regarded as examples of chemotherapy, and one of them—gold therapy—has been prominent in tuberculosis. Nevertheless it is true to say that the most successful recent efforts at specific chemical treatment can be explained on the basis of primary direct action of the agent on the micro-organisms.

The hundred years covered by the present review will, for convenience of discussion, be divided into four periods: 1850–80, 1880–1910, 1910–35, and 1935–46. The reasons determining these arbitrary divisions will be evident from Table I.

TABLE I

1850–1880
Pre-chemotherapeutic period—the background
(A few traditional specifics of value in infective diseases—e.g., cinchona for malaria, mercury for syphilis)
1880–1910
Tentative period of chemotherapy (1890–1900)
Period of first successes with synthetic substances (trypan red, salvarsan, etc.) in protozoal and spirochaetal infections (1900–10)
Tubercle bacillus discovered (1882)
Tuberculin discovered (1890)
Unsuccessful chemotherapeutic experimentation in tuberculosis
1910–1935
First success with synthetic substance (optochin) in systemic experimental bacterial (pneumococcal) infection (1911)
Chemotherapeutic tests with synthetic and natural substances in experimental tuberculosis negative or inconclusive
Gold therapy in clinical tuberculosis flourished (1925–35)
1935–1946
First success with synthetic drug (sulphanilamide) in systemic bacterial (streptococcal) infection in man (1935)
Sulphonamides in experimental tuberculosis (1938–46)
Sulphone compounds in experimental and clinical tuberculosis (1939–46)
Gold therapy for tuberculosis in decline
First successes with antibiotic substance (penicillin) in systemic bacterial infection in man (1940–41)
Streptomycin in experimental and clinical tuberculosis (1945–6)

1850–1880

The period 1850–80 was remarkable because the first foundations of modern chemotherapy were being rapidly laid, although success in this new branch of science, as a result of purposeful experiment and synthetic chemical search, was to come only later. Indeed, as Dale (1923, 1943) points out, there were few drugs of that time which, in the light of present knowledge, had remedial value due to action on the infective agents responsible for the diseases in which they were used—mercurials and iodides for syphilis, cinchona and quinine for malaria, and ipecacuanha for (amoebic) dysentery, to which we should probably add chaulmoogra oil for leprosy; and these remedies—triumphs of empiricism—antedated by some hundreds of years the discovery of the parasitic causes of their

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† An antibiotic substance may be defined shortly as a chemical substance produced by a micro-organism and found to be inhibitory to the growth or activity of other species of micro-organism (see also Waksman, 1945; Oxford, 1945).

respective diseases, and, in the cases of the biological products cinchona, ipecacuanha, and chaulmoogra, the elucidation of their active components.

In this pre-chemotherapeutic era we have the background of our subject. The most relevant of the many and exciting developments in science may be enumerated.

1. A phenomenal expansion of synthetic organic chemistry was accompanying the rise of the synthetic coal-tar dyestuffs industry. (This development was most prominent in Germany, due to the stimulus of economic demands and the lack of available natural products: yet it was an Englishman, Sir W. H. Perkin, who in 1856 prepared the first aniline dye (see Clegg, 1938).)

2. The science of human microbiology was being founded by the proof that micro-organisms could be factors in the causation and transmission of infectious diseases. Human diseases in which this was demonstrated included anthrax, relapsing fever, leprosy, gonorrhoea, and typhoid fever—but not yet tuberculosis. Pasteur and Koch were, of course, two of the giants in this field.

3. Pharmacology was ceasing to be a purely empirical subject, with the effects of drugs judged only at the bedside; and the advances both in synthetic organic chemistry and in physiology led to the union of these into an experimental science, and so to the study of the action of drugs on abnormal and artificially diseased animals—i.e., experimental pathology.

4. The selective staining properties of newly synthesized aniline dyes were being used by Weigert, Koch, and others.

5. Knowledge of local antisepsis was arising through the work of Lister and others; this advance, with phenol as starting-point in 1867, again illustrated how the influence of the distillation products of coal tar permeated the developments of this epoch.

In this pre-chemotherapeutic period, too, even the use of antibiotic substances in medicine was foreshadowed, for microbial antagonisms were first described in 1877 by Pasteur and Joubert, who had observed that the growth of anthrax bacilli *in vitro*, and the development of the disease *in vivo*, could be inhibited by certain air-borne micro-organisms; and these authors suggested that such antagonisms between different species might eventually have therapeutic applications.

As regards the advancing knowledge of tuberculosis, this period includes what Pagel (1927) has called the era of definite morphological investigation, arising out of Laennec's work and leading immediately into the period of experimental pathology and of the bacteriological study of experimental infections; thus we can see a thread running from Virchow's contributions to cellular pathology (1858), through Villemin's proof in 1865 of the specificity and transmissibility of tuberculosis, to Koch's discovery of the causative parasite in 1882. In the therapeutic field the principal measures recommended at this time were rest, sometimes tempered with exercise, and plentiful diet, often to the point of overfeeding, where the patient could afford it. The Brompton Hospital had been founded in 1848 and a sanatorium was started in Germany in 1859, but it was not till the end of the century that these methods began to be generally accepted; while fresh-air treatment was still a novelty to many and the rationale of isolation was disputed.

Among these general measures of treatment drugs found their place merely as one more weapon in the physician's armoury, and one which, perhaps wisely, many regarded as too blunt to use. There were, however, many others of whom Wells and Long (1932, p. 194) have written: "It was a time when a drug was seldom dropped, although it was a routine procedure to add one." Among the drugs there were quite an array which were commonly believed to strike at the root causes of tuberculosis and not merely at its symptoms—even though the bacillus was yet to be discovered—and their administration therefore deserves to be considered as an effort at empirical chemotherapy. These drugs were based largely on the traditions of the past, and showed little evidence of the impact of current advances in understanding of the pathology of tuberculosis. A patient of this time might have been treated with one or more of the following popular drugs in this class: (1) inorganic arsenical compounds, traditional for phthisis since antiquity (Hippocrates, Pliny); (2) tannin, an ingredient of antiphthisical medicaments known to Avicenna in the 11th century; (3) cod-liver oil in very large doses, this product having been prescribed for consumption in 1774 by Thomas Percival, but having probably been in use among fisherfolk much earlier; (4) iodine or iodides, which, in the form of seaweed, had been recommended for scrofula by the Salerno School in the 11th and 12th centuries; (5) mercury and gold, the use of both of which for phthisis and for scrofulous glandular swellings, as well as for syphilis, dates from the time of Paracelsus and Fracastorius, early in the 16th century; and (6) creosote, which had originated more recently, around 1830. In addition to these drugs of international popularity there were countless supposed specifics of indigenous vegetable origin in various parts of the world—e.g., garlic in the Ayurvedic and Unani systems of medicine.

Clearly the controlled experimental search for chemotherapeutic agents in tuberculosis had not yet begun. Moreover, unlike the use of the traditional drugs—ipecacuanha, cinchona, and mercury—in protozoal and spirochaetal diseases, subsequent experimental work has failed so far to show a definite scientific basis for success of any of the early empirical "specific" remedies in tuberculosis, with the possible exception of the ingredients of cod-liver oil. However, we should keep an open mind on this matter.

1880–1910

The 30 years 1880–1910 saw the establishment of chemotherapy as a flourishing branch of medical science, but (apart from antisepsis through local application) the bacterial infections remained resistant, even though the micro-organisms causing most of them had been discovered by the end of this period.

In the first part of the period—viz., the last two decades of the century—the foundations of chemotherapy were being strengthened and many of its tools fashioned. The expanding production of synthetic coal-tar derivatives was creating a pharmaceutical science. Many new dyes were being synthesized, the bacteriostatic and bactericidal action of some of them demonstrated, and their power of manifesting micro-organisms, both in isolation and in the tissues, through selective staining (e.g., acid-fast stain) exploited. Knowledge of immunology was being rapidly accumulated. The scope of the new experimental pathology was widening, attention being directed to the infective causes that were being discovered in one disease after another, including tuberculosis, with the implication that the ultimate objective of treatment should be to cure through the eradication of the parasites by the specific action of immune bodies or antiseptic chemical substances, and not merely to assist Nature by alleviating symptoms. Furthermore, current reports of the antagonistic power of certain bacterial species against others were opening up the therapeutic potentialities of chemical substances synthesized by micro-organisms themselves, thus bringing the anticipations of Pasteur and Joubert nearer. Ehrlich, greatly influenced by this complex of developments, to which he was himself a contributor, was paving the way for his great work in the theory and practice of chemotherapy by forming his conception of selective and specific chemical affinities.

First Experiments in Chemotherapy

But laboratory chemotherapeutic experimentation had already started, and it is interesting for our purpose that what was probably the first such experiment in animals, using a definite chemical entity—i.e., an attempt to produce internal disinfection in a systemic infection—was made by Robert Koch in 1881, a year before he announced his discovery of the tubercle bacillus. Koch's experiment—a test of mercuric chloride, which was very active against anthrax bacilli in the test-tube, in anthrax-infected guinea-pigs—was not successful; nor were most of those experiments made subsequently in various protozoal and bacterial infections, including tuberculosis, by himself, Behring, Ehrlich, and other contemporary workers, using the older antiseptics and the newer synthetic dyes (methylene blue, however, was shown by Ehrlich and Guttmann in 1891 to have some value in malarial infection). Indeed, by 1900 the number of chemical remedies that could be said on scientific evidence to deal directly with the causes of infective diseases had scarcely increased, and Dale (1943) describes this point as about the low-water mark of interest and confidence in the remedial value of drugs. The hope of bringing specific chemical substances into therapeutics, which the discovery of the aetiological role of micro-organisms

had aroused, gave way to hopes based on specific immunotherapy, which had already produced such signal successes.

Yet, a few years later, the general outlook changed when the first great advance was made in the use of synthetic substances in chemotherapy; for in 1904 Ehrlich and Shiga produced virtually the first modern chemotherapeutic achievement—the rapid sterilization of an experimental trypanosomal infection (*T. equinum*) with a chemical synthesized for that particular purpose (trypan red). This was followed by further successes in the field of trypanosomal and spirochaetal infection, culminating in the first unequivocal application to human therapy—the use of salvarsan in syphilis in 1910 by Ehrlich and Hata. These successes were largely due to the systematic search by Ehrlich and his colleagues among synthetic coal-tar dyes and organic arsenicals in conjunction with test-tube and animal-infection tests. Here was the exploitation of the relation of the activity of therapeutic agents to their chemical structure, the "biological experimentation carefully co-ordinated with constructive chemical manipulation" (Lewis, 1917a) that is the very essence of therapy with synthetic chemicals. In contrast to these successes among the protozoa, *in vivo* laboratory experiments with synthetic substances in systemic bacterial infections during this decade were still negative or inconclusive, even though the substances used might be strongly inhibitory to bacterial growth *in vitro*.

A few years before Ehrlich and Shiga's historic success with a synthetic substance there was also a small but significant advance in the use of agents of microbial origin in chemotherapy when in 1889 Emmerich and Löw published their experiments on "pyocyanase" from *Ps. aeruginosa*. This work had been preceded, as Florey's (1945) fascinating review shows, by 20 years of scattered observations on the antagonistic relations of micro-organisms, following Pasteur and Joubert's original report, and including attempts to cure or protect animals infected with one species by administration of an antagonist. In these earlier *in vivo* experiments the antagonist had been provided mainly by whole bacterial cultures (living or sterilized), and, indeed, Cantani (1885), of Naples, claimed some success in human pulmonary tuberculosis by the insufflation of a particular saprophytic bacterial culture designated as "*Bact. termo*." Now, however, apparently for the first time, a bacterial extract was found efficacious in experimental infection, for Emmerich and Löw reported that the injection of pyocyanase preparations could protect rabbits against anthrax; and cures of animals after infection were also noted with similar preparations. In the first decade of the century pyocyanase came into widespread clinical use in various infections, at first internally and later mainly by local application, but in spite of promising early results its use was eventually more or less abandoned, possibly with insufficient reason. During this period little further success was evidenced in microbial therapy in general, in either experimental or human infections; and I can find no record of the inhibition of growth of tubercle bacilli by the actual products of micro-organisms, even *in vitro*, before 1912.

Reversion to General Measures

What was happening during these 30 years in the field of human tuberculosis? The modern conception of immunity in this infection originated from Koch's experiments from 1891 onwards, and was added to by the results of necropsy series (Kuss, Naegeli, etc.) and of the diagnostic tuberculin test (Koch, Pirquet, Mantoux, etc.) in man; while the concrete turn given to the idea of contagiousness by knowledge of the transmission of the infecting micro-organism canalized preventive action into hygienic measures, sputum disinfection, etc. As regards treatment, after the initial high hopes of specific cure of tuberculosis by chemical agents which were raised by Koch's discovery of the bacillus, the change of emphasis from chemotherapy to immunotherapy (to which we have already drawn attention generally) became particularly evident, since Koch's production of old tuberculin in 1890, and his experiments on guinea-pigs with this and later similar products, caused his attention to be focused on tuberculin as a remedy in man; and in so doing he may have actually impeded therapeutic progress. Thus, Koch prefaced his description of tuberculin by naming a number of drugs (mercury salts, gold cyanide, etc.) that he had found tuberculostatic in the test-tube but ineffective in animals; whereas he had found that tuberculin specifically and effectively acted on tuberculous tissue and in that way rendered the pathogenic bacteria harmless without injuring the body. Small wonder if the aim of chemotherapy, as applied to tuberculosis, received a setback and tuberculin therapy became the vogue. But when, after a tremendous wave of enthusiasm, confidence in specific treatment with the various tuberculins also began to wane in many quarters, and still no chemotherapeutic agent appeared to stand the test of controlled scientific experiment, many of the more critical physicians fell back on general measures to strengthen the patient's resistance—fresh air, rest, diet, etc. The still few but increasing number of sanatoria and special hospitals assisted in these measures, though ultimate results were so often disappointing. It may be recalled also that the first dispensary was opened by Robert Philip in 1887, and that in 1894, following isolated preliminary observations during the previous 70 years, Forlanini published his first series of results of artificial pneumothorax, though the latter treatment was not to become general for another 20 to 30 years.

Certain anti-phthisical drugs of the period, nevertheless, had a reputation for exerting either a specific direct action on the infecting organisms or an indirect effect through stimulation of host defences. These were substantially the same empirical and traditional remedies that we have listed as in use before the discovery of Koch's bacillus, though new reasons, often of tenuous nature, were offered for their supposed effects: salts of inorganic arsenic (and the recently introduced organic cacodylate), which not uncommonly resulted in liver damage; tannin, despite the fact that no inhibition was found in contemporary guinea-pig experiments; creosote and its derivatives, sometimes in enormous dosage, on the dubious rationale that a protective tissue reaction was promoted around the tubercle; cod-liver oil; iodides; and a revival of calcium administration (popular in antiquity, recommended in the 10th century by the Persian physician Mowaffak, in the form of powdered crayfish), on the assumption that it counteracted a supposed demineralization accompanying tuberculosis (see Piéry and Roshem, 1931). In addition to these standard remedies, salts of copper (A. and E. Luton in France) and gold (White (1891) and Gibbes and Shurly (1892) in the U.S.A.) were used sporadically; while a few clinicians attempted straightforward internal disinfection of their patients with antiseptics, despite lack of evidence of efficacy in non-toxic doses in animals. Thus, Dr. Vere Pearson recalls (1946) that Dr. Robert Maguire, a physician to St. Mary's and Brompton Hospitals around the turn of the century, gave a weak solution of formaldehyde intravenously, and that this, as well as a weak silver salt, had a vogue for a few years. I have omitted mention of the innumerable "consumption cures" of this period, whose patent lack of scientific basis did not get them far; and we are not concerned with symptomatic medication, for which, of course, a considerable number of drugs (including creosote) were used for apparently sound reasons.

1910–1935

So far, even taking into account the very suggestive experiments with pyocyanase, there had been no unequivocal demonstration of the chemotherapeutic sterilization of a general infection of *bacterial* origin in the animal living body. The cure of pneumococcal septicaemia in mice by Morgenroth and Levy in 1911, using "optochin," a synthetic homologue of quinine, raised hopes in this direction, even though this experiment proved inapplicable to human therapy. But while, during the next 25 years, important new local antiseptics came to the fore in the control of bacterial wound infection and infected mucous membranes, particularly as a result of the first world war, attempts to effect cure of a systemic bacterial infection in man by *internal* chemotherapy were persistent failures. With the possible partial exceptions of new chaulmoogra derivatives in leprosy, and of sanocrysin and related compounds in tuberculosis (see later), mycobacterial infection shared in this failure. Ehrlich's (1914) warning, given at the International Medical Congress in London two years before his death, of the hard struggle that would be required for success in antibacterial chemotherapy—above all in tuberculosis—proved only too correct. Even local disinfection in tuberculosis was fraught with difficulty—witness the inconclusive

results with certain essential oils, such as "gommenol," in the pleural cavity.

Of the many chemicals—both new ones, and old ones in new forms—that were tested in the laboratory for anti-tuberculous activity during this period, some of the more important will be briefly discussed (for fuller surveys see Cummins, 1930; Wells and Long, 1932; Findlay, 1940).

Dyes—Cod-liver Oil—Chaulmoogra Oil

Various aniline dyes and chemical modifications thereof were investigated by Paul Lewis (1912–17), De Witt (1913–23), and others. Some—e.g., azo-dyes, members of the acridine series, and other basic dyes—showed selective inhibition of growth of the bacillus in the test-tube as compared with other bacterial species. Some, either alone or in a chemical combination with other agents such as metals, phenol, or iodine, penetrated and inhibited the bacilli *in vitro* and were able to penetrate the tubercles in the body; but while they might extend the life of infected guinea-pigs and rabbits and reduce the anatomical extent of the lesions—one of the most encouraging in this respect being methylene blue and its derivatives—they did not prevent or cure the experimental disease. None of these dyes found a place in internal medication in man.

Another group tested experimentally was creosote and many allied preparations (e.g., thymol)—popular empirical remedies, as already stated. They were not found to be very highly bacteriostatic *in vitro*, and animal infection experiments failed to give evidence definite enough to justify their clinical use in tuberculosis on grounds of specific antibacterial action—any good results were more likely to be due to non-specific symptomatic effects.

Much experimental work was done during this period to find a rationale for the traditional use of cod-liver oil in human tuberculosis. On analogy with the apparent value of fatty acid fractions of chaulmoogra oil in leprosy, sodium morrhuate was investigated in the laboratory and was applied clinically in pulmonary tuberculosis, in lupus vulgaris, and in sarcoidosis, but the results were inconstant (Cummins, 1925). Despite this, the presumed benefit of cod-liver oil was—and still is—ascribed by some to a direct antibacterial action of component fatty acids. After the discovery of the fat-soluble vitamins, another hypothesis for the clinical benefit of cod-liver oil arose—namely, its A or D content. The few experiments on the effect of vitamin A deficiency in experimental tuberculosis were inconclusive (Steiner, Greene, and Kramer, 1937b), but the more commonly held possible explanation was the mobilizing action of vitamin D on calcium. In spite of the apparent association of calcification with healing, there was little clear direct experimental evidence in support of either calcium or vitamin D therapy (Mayer and Wells, 1923; Grant *et al.*, 1927, 1930; Steenken and Baldwin, 1937; Steiner, Greene, and Kramer, 1937a): nevertheless, the value of these substances has been persistently maintained by many clinicians, and one hesitates to deny that the importance of calcium or phosphorus metabolism in tuberculosis treatment may yet be revealed—certainly the vitamin D factor in cod-liver oil requires re-examination in view of the recent clinical reports by Charpy and Dowling of regression of lupus after giving calciferol.

The possibilities in tuberculosis of the leprocidal chaulmoogra oil itself, and of its cyclic unsaturated fatty acid constituents—e.g., chaulmoogric and hydnocarpic acids (which had been isolated a little before the beginning of this period)—were also investigated; and structurally similar many-carboned fatty acids, containing rings or branched chains, were synthesized (see Robinson, 1940). Many of these natural and synthetic substances were tuberculostatic in the test-tube (Walker and Sweeney, 1920; Stanley *et al.*, 1932). A number of them were tested in experimentally infected animals, and some prolongation of life and suppression of lesions claimed, but the matter remained in doubt; trials in human pulmonary tuberculosis also were inconclusive (see Wells and Long, 1932; Emmart, 1946). As will be noted later, interest in chaulmoogra derivatives and allied synthetic compounds, as well as in long-chained fatty acids in general, has been recently revived, and with more promise.

It is not possible to enumerate more than a few of the many other chemical substances that were investigated or reinvestigated *in vitro* or in experimental animal-infection during these 25 years. They include cinnamates, terpenes from essential oils (Courmont), and a variety of other organic compounds (e.g., see Kuroya, 1929; Meissner and Hesse, 1931; Hesse and Meissner, 1931); iodine and iodides; minerals such as coal (Cummins and Weatherall, 1931); and compounds of metals such as arsenic, mercury (De Witt, 1921), copper (Linden, 1912, 1920), and, above all, gold (Feldt, De Witt, Möllgaard), both in organic and in inorganic forms. The *in vitro* activity of some of these substances was high, but either they were toxic or the results in infection experiments proved mostly negative or indecisive. Where they were apparently positive, as with some compounds of the heavy metals, the benefit was ascribable usually to an indirect effect of local tissue reaction or of stimulation of immunological or other defence mechanisms. The particular approach of Walbum (1921–9; Walbum and Boas, 1931) may be mentioned; the use of minute doses of a number of metals under certain conditions, especially cadmium and manganese, was stated to affect the immunological reactions of the body towards the infecting tubercle bacilli.

Early Work with Antibiotics

In comparison with the many chemotherapeutic attempts against tuberculosis, using the above-mentioned natural and synthetic compounds, reports of results obtained with antibiotic substances of microbial origin during these 25 years were very few; and, reading the literature, one is struck by the lack of connexion between these two streams of scientific endeavour.

Rappin (1912), having found that filtered broth cultures of certain spore-forming bacteria—*B. subtilis*, *B. mesentericus*, and *B. megatherium*—were active *in vitro* against *M. tuberculosis*, injected tubercle-infected guinea-pigs with culture filtrates from *B. mesentericus*, and reported that the disease was thereby prevented or suppressed and that no toxic manifestations followed the injections. About the same time another Frenchman, Vaudremer (1912–13), described a substance obtained from *Aspergillus fumigatus*, in contact with which tuberculin was inactivated and tubercle bacilli lost their pathogenicity for guinea-pigs and rabbits. Although Vaudremer apparently made no direct protection experiments on infected animals, he reported that clinical trials of his extract were in progress in cases of pulmonary tuberculosis in Paris hospitals; the extract was well tolerated, but preliminary results on 200 patients were inconclusive. These, probably the first chemotherapeutic experiments with antibiotics in tuberculosis, are particularly interesting in the light of present intensive laboratory study of the potentialities, both of the genus *Aspergillus* and of the *B. subtilis* group of spore-formers, against this mycobacterium. Little further progress seems to have been made as an immediate result of the observations of Rappin and Vaudremer, and in most of the publications during the next 25 years on antagonisms against tubercle bacilli the antagonist was in the form of whole cultures and not the latter's separated antibiotic products. These reports provide evidence of lysis, death, or loss of virulence of tubercle bacilli produced by cultural association with, or by addition of, the antagonistic micro-organism: the latter included *B. subtilis* (Van Canneyt, 1926; Schiller, 1930); *B. mycoides* (Much and Sartorius, 1924; Kimmelstiel, 1924); "*B. tuberculophilus*" (Puntoni and Favia, 1934); an anaerobic bacillus (Passini, 1926); *Escherichia coli* (Peretz, Newler, and Larionow, 1936): a staphylococcus designated *M. antibioticus* (Dujardin-Beaumetz, 1932, 1934); and yeasts (Schiller, 1925, 1927). It may be noted that culture filtrates from Much's cytolytic bacillary strains were active as well as whole cultures, and that a lysate of tubercle bacilli was used in human therapy; while in Schiller's experiments with yeasts and *B. subtilis* the organism to be attacked apparently played a part in "forcing" the antagonism: but neither of these authors produced clear evidence of inhibition of the tuberculous process in the body through an antibiotic effect.

While the tremendous amount of information accumulated by all this anti-tuberculosis chemotherapeutic research has been and will be of considerable value, and some of the synthetic and natural substances are being submitted to further study and development, the sum total of short-term practical gains to the clinician must, in retrospect, be regarded as meagre. A number of the drugs investigated in the laboratory found their way into contemporary therapeutics, often without full justification, but their favour was mostly short-lived or local; and the same applies to Vaudremer's antibiotic. The outstanding exception was gold therapy.

The "Gold Decade"

The years 1925–35 might be termed the "sanocrysin" or "gold" decade in tuberculosis treatment. The more recent background to that period was as follows. Koch in 1890 reported that simple gold salts were strongly inhibitory to the growth of tubercle bacilli *in vitro*, but ineffective in experimental tuberculosis in guinea-pigs. Nevertheless, success was claimed with gold salts in phthisis by some clinicians of that time (see above). Spiess and Feldt in Germany during the 1914–18 war recommended a gold–cantharidin compound, followed (Feldt, 1917) by an aromatic compound of gold called "krysolgan," which was used principally in German clinics but had lost much of its popularity by the time "sanocrysin" became general. While highly active *in vitro*, this compound's introduction into clinical practice had a rather insecure foundation in animal experiments. Meantime De Witt, in the

U.S.A., investigated various gold compounds in experimental tuberculosis, with negative results, so that gold therapy did not look promising (De Witt *et al.*, 1916, 1918; De Witt, 1918). Then, in 1924, Möllgaard introduced a preparation of sodium aurothiosulphate as "sanocrysin," believing this to be the answer in Ehrlich's sense—i.e., a substance that would reach and attack the bacilli, active *in vitro*, and able to prevent the experimental disease in animals without serious damage to the host's tissues. Rarely, wrote Secher (1927), who first applied the drug clinically, had a therapy been so well based on experimental work. Subsequent events threw doubt on this assertion, for while some eminent workers (e.g., Madsen and Mörch, 1926–7) confirmed and extended Möllgaard's striking claims in experimental tuberculosis, others reported in an opposite sense, and Okell and Parish (1931) concluded that "tuberculosis in guinea-pigs is not influenced by sodium aurothiosulphate." Again, the *in vitro* inhibitory action of sanocrysin was found to be markedly affected by body constituents, etc., and the view gained ground that its action *in vivo* was not directly bactericidal but was indirect, through stimulation of tissue cells, possibly of the reticulo-endothelial system, or through excitation of hyperaemia in the tissues round the tuberculous foci, rather as tuberculin and other salts of gold and various heavy metals were presumed to act (see Cummins, 1930; Wells and Long, 1932).

Sanocrysin was given to the medical world in 1924 as a specific, and most of the profession accepted it, partly perhaps as a welcome change from tuberculin. Möllgaard's preparation was followed by others from various sources, some of which could be given intramuscularly instead of in the vein. A mass of papers was published (those up to 1933 are reviewed by Cummins, 1933). Gold caught the public imagination, as is evidenced by the popularity of the rhymes technical and not so technical that were written around it.

After a period of rather indiscriminate application with high dosage, a more cautious attitude gained ground; and more mature views as to the best indications for gold therapy in pulmonary tuberculosis may be expressed as follows (there being some overlap): (1) in recent "exudative" lesions; (2—perhaps the best indication) to check exacerbation—e.g., in subacute or chronic disease with fresh spread, or in contralateral extension occurring in the course of pneumothorax treatment; (3) to check constitutional disturbance. Gold was, however, persistently used in a variety of cases, in some of which it could, at the best, provide only a placebo.

Although the fatalities of the earlier years were reduced by general acceptance of smaller dosage, objectionable and sometimes dangerous acute or subacute complications were increasingly and persistently reported. The recognition of toxicity, and the inconclusive nature of the benefit conferred, were the main factors in the decline in the use of gold in tuberculosis.

A rough measure of the waxing and waning of interest in this therapy is given in Fig. 1, which shows, from 1925 (when sanocrysin

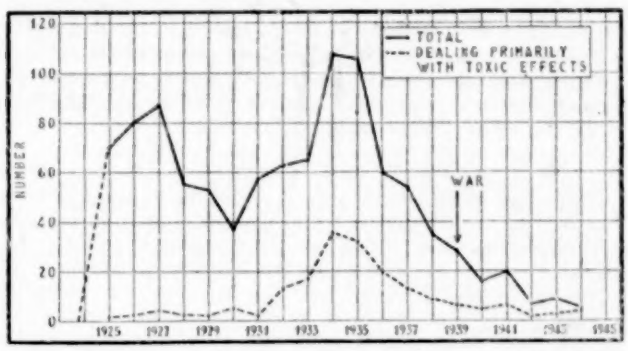

FIG. 1.—Graph showing the number of papers on gold treatment in tuberculosis listed in the *Index Medicus* during the years 1925 to 1944.

was first in general use) to 1944, the total annual number of papers referred to in the *Index Medicus* under the heading "Gold Therapy in Tuberculosis," and the number of papers dealing primarily with toxic effects. The graph shows a first wave of publications, then a decline, then a second wave reaching its peak in 1934–5, after which there is a steady decline up to 1939 and after. It will be seen further that, after a virtual absence during the first six years of papers reporting primarily on toxic effects, their number rises and remains a substantial proportion of the total. The low level of the curve of publications at its end-point is a reflection of the fact that at the present time gold is seldom used for the commoner forms of tuberculosis, except by a few stalwarts: thus, inquiry at three large county tuberculosis institutions in the London area elicited that in 1944 the percentages of patients discharged in whom gold therapy was used were 3.1 (Clare Hall), 0.9 (Harefield), and 0.7 (Colindale), as compared with corresponding percentages in 1938, in the first two hospitals, of 17.8 and 5.7.

This astonishing acceptance of a remedy, and its subsequent rejection without any immediate better substitute, is only equalled by the preceding, but overlapping, dramatic rise and fall of tuberculin therapy. I have considered this phase at some length because the several probable explanations serve also as a lesson for future chemotherapeutic assessments. (1) The laboratory groundwork on the curative effect of sanocrysin was insecure, and the drug was heavily sponsored for general therapeutic use without adequately critical clinical trials. (2) The drug's toxicity relative to presumed effective dose was at first underrated. (3) The clinical benefit was not dramatic or constant enough to dispense with balanced controls, which were in fact rarely used, and where they were (Amberson *et al.*, 1931) the results were discouraging. (4) Investigation was rendered difficult because, as Cummins (1933) points out, pneumothorax treatment (which was extending rapidly contemporaneously) was naturally given preference, with the result that sanocrysin tended to be elbowed out and to be used on the less favourable forms of the disease, in which assessment of effect is equivocal; this is less likely to happen now, when the more discriminating use of collapse therapy leaves opportunity for many early cases to be submitted to controlled chemotherapeutic test.

Opinion is still divided on the real value of gold therapy in pulmonary tuberculosis. A few—e.g., Cohen (1943)—hold that, prudently administered on judiciously selected cases, it still has a place; but the undoubted majority consider that, although, like tuberculin, it may produce some advantageous effect in certain types of lesion, the danger makes the risk hardly worth taking.

To bring the use of heavy metals up to date, I should add that (in addition to Walbum's special application) cadmium has been advocated as a less toxic substitute for gold, but without finding much general favour (see Heaf, 1937; Cornwall, 1938; Schedtler and Rodiger, 1941).

The End of the Period

The end of this section of our survey—1935—saw a general and probably healthy reaction among clinicians against drugs in tuberculosis, apart from a few valued symptomatics. The lack of a scientific basis for most of the traditional empirical "specifics" mentioned earlier had won more or less general acceptance among the medical profession, with their consequent virtual disappearance from therapeutics. Two important exceptions were cod-liver oil, still enjoying world-wide repute, and calcium preparations (e.g., calcium gluconate), strongly advocated in some Continental countries. Replacements of the traditional remedies by newer drugs reported on favourably from the laboratory, sometimes on inconclusive evidence, had been limited and temporary. The crest of the wave of interest in gold therapy had been passed. If we add to this negative list the fact that tuberculin as a means of treatment had been generally abandoned except for certain eye, genito-urinary, and other special conditions, a diminution in faith in the specific approach—immunological or chemotherapeutic—to the treatment of tuberculosis is hardly surprising. "No treatment at present can be aimed directly against the causal agent . . . ," concludes Browning (1935) in a lecture on chemotherapy; "immunization does not appear to influence the established disease, and the only procedures commonly approved consist in conserving general health, resting affected parts, and removing necrotic tissue"; but he adds that "it is difficult to believe that we must remain bankrupt in methods of directly attacking the tubercle bacillus."

Positive advances in other fields of anti-tuberculosis activity during the preceding 25 years provided compensation for the

setback in specific treatment. Sanatoria had expanded in number and developed in scope, both for pulmonary and for non-pulmonary cases. In Britain the National Tuberculosis Scheme, inaugurated in 1912, had proved its worth. Artificial pneumothorax and other forms of collapse therapy had come into their own, particularly from 1920 onwards, when radiographic control became reasonably practicable. Much greater emphasis was being laid upon preventing the disease by reduction of contagion and by insistence on contact examinations. The understanding of the immunology and epidemiology of tuberculous infection had been advanced by the work of Ghon, Opie, Cummins, and many others.

[Part II, with a full list of references, will appear in our next issue.]

WEIL'S DISEASE: A RARE CONDITION?

BY

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An attempt is here made to establish a number of conclusions relating to this disease, which is still generally regarded as of academic interest only. In the first place, we are convinced that the infection is not by any means a rare one, nor is it likely to be encountered only by those whose work brings them into contact with certain industrial groups, such as sewer workers and miners. Secondly, we believe that it is not unreasonable to expect a diagnosis to be made within the first few days of the illness upon clinical methods alone, and that the only requirements are a familiarity with the characteristic picture as seen at this stage of the disease and a knowledge of a number of special points to be looked for and of simple laboratory investigations which must be carried out. Thirdly, as a result of our early recognition of suspected cases we have had the opportunity of watching the effect of specific treatment given at this stage of the infection, and our observations have left a feeling of confidence that this is of real value and may even be life-saving. Finally, as a result of considerable familiarity with the condition, a number of observations have been made which we believe have not been recorded before. We feel that a note on these may be of value.

Frequency of the Disease

In July, 1936, when Weil's disease was to us nothing more than an almost forgotten name, a case came under our care which proved to be a very typical example of this illness. A year later a second case was recognized, and by June, 1938, we had dealt with four such cases. These four cases were of particular local interest, for it appeared that in each case infection had been the result of bathing or working in the same stream (Robertson, 1938). During the next seven years a further 30 cases have been seen—that is to say, we have been encountering the condition four or five times every year.

So far as we have been able to ascertain, the total number of cases recognized during this time in the area in which our work is carried out has certainly not exceeded 40. These rather remarkable figures can surely indicate only two things: the relative frequency of the infection, and the ease with which it has been able to evade recognition.

Recognition

Excellent accounts of the clinical picture are available in textbooks and have been elaborated by numerous workers elsewhere, so that only a brief reference to this is needed here. The infecting organism, *Leptospira icterohaemorrhagiae*, is carried by the rat, and it can be assumed that something like 40% of all rats are infected. The leptospira leaves its host by way of the animal's renal tract. Human infection occurs as the result of contact with water which has been contaminated by rats' urine. Only fresh water can become infective, as quite small amounts of salt render the organism inactive; while direct sunlight has a similar tendency. Stagnant water is more dangerous than that of a freely flowing stream. Under these conditions the leptospira can probably survive indefinitely. The incubation period appears to be about ten days.

No age is immune, and we have seen the disease at all ages from 5 to 78 years. Characteristically, the onset is abrupt and the victim has been in good health. The symptoms are high fever, often a rigor, severe headache, generalized pains, not infrequently gastro-intestinal symptoms, haemorrhages from some part of the body, and in about half the cases jaundice of varying degree after the fourth or fifth day. In some of the more severe and jaundiced cases serious renal impairment appears, with an increasing retention of nitrogen, sometimes terminating in anuria. It is in this group of cases that fatalities occur.

It must be emphasized that half the cases, whether treated early or not, show no jaundice at any stage of the illness, and among these the incidence of a lymphocytic leptomeningitis is very high. Probably all cases show a peculiar conjunctival suffusion at some time, though this may be transient and may be missed.

Of particular significance are the muscle pains. These are often intense and may persist for several days. The pains are in muscle and are not related to the joints. During this phase pressure over muscle, particularly in the limbs, is often intolerable, and this objective finding almost always persists for several days after the subjective symptoms have subsided.

The headache is severe and by its occipital predilection suggests meningeal involvement; this is often further emphasized by the presence of neck rigidity and a positive Kernig's sign. These findings usually make lumbar puncture inevitable; indeed, several of our cases reached us with the diagnosis of meningitis already made. The cerebrospinal fluid is frequently under pressure and is always water-clear. Pathological examination even in a case with very pronounced meningism may be quite normal when the routine tests are applied; but more often there is slight increase in protein, with a pleocytosis which may reach several hundred cells per cubic millimetre. The sodium chloride level is always normal. If the urea content of the fluid is investigated it is found invariably to be raised above the level which would be regarded as normal for the patient's age. In the laboratory which carries out most of our work the urea content is determined in all lymphocytic fluids which show a normal amount of chloride. This simple arrangement has been of great help in detecting a few early cases.

Haemorrhages are seen at some stage of the illness in most cases, and these may appear early. They may be from the nose, the gums, the gastro-intestinal tract, or into the skin and mucous membranes. When herpes labialis is present it is often haemorrhagic. In some cases a curious mottled appearance of the palate is seen; this was first pointed out to us by Dr. Evan Jones, and has been seen four times. It has not been possible by haematological investigation to determine the cause of this tendency to bleed. Bleeding times, clotting times, and platelet counts have always been normal; the prothrombin level has not been estimated in our cases.

The *urine* usually shows the presence of albumin, often cylindruria is observed, and not infrequently red cells are present, but a normal urine does not exclude the diagnosis. Often the *white cell* count is unaltered in the first few days. This statement is the reverse of what has usually been recorded, but time and again we have noted this normality. When jaundice has appeared the rule is a polynuclear leucocytosis, thus helping to differentiate leptospiral jaundice from that due to infective hepatitis. By far the most important single pathological investigation is undoubtedly the determination of the *blood urea* level. In all our cases this has been raised from the earliest stages, and the level to which this has reached has always provided a useful indication of the severity of the infection.

It should be possible to detect the infecting organism in the blood stream during the first five or six days of the illness, either by direct examination of blood smears with dark-ground illumination methods, or by animal inoculation of the infected blood. We have been successful only once in this, and then by the latter method. It is our view that these diagnostic methods are unnecessary.

Finally, when suspicion has been aroused, a most careful inquiry into the patient's work, home surroundings, and habits with regard to bathing, etc., in fresh water must be made. In nearly all our cases there has been some quite obvious source of possible infection; and in those suspicious cases where no such possibility has been obvious we have almost always failed to prove the diagnosis. We regard this part of the investigation of cases as of the utmost importance.

It is well known that during the septicaemic stage of the illness—that is to say, during the first five or six days—antibodies upon which the diagnostic agglutination reaction depends have not developed in sufficient amount to give a positive finding even at the lowest dilutions. It is therefore useless to expect such a finding until after this stage is over.

At this point I would like to record our deep appreciation of the help we have received from Dr. J. C. Broom and his colleagues of the Wellcome Research Institution, who have carried out all our serum testing for us.

At the appropriate time blood has been sent to Dr. Broom for agglutination testing. Where possible, samples have been forwarded at intervals. This has been done for two reasons. In the first place, a rising titre at which agglutination can be demonstrated is clearly of more diagnostic value than any single test, and, in the second place, we have observed that in the more severe cases the first positive finding has not appeared at the usual time—that is to say, the fifth or sixth day—but has been delayed for several days. In one fatal case the test was negative on the 9th day but positive 1 : 100 on the 11th, death ensuing on the following day. In another fatal case the test was negative on the day of admission to hospital—the 7th day of illness—positive 1 : 30 on the 8th day, 1 : 100 on the 9th, and 1 : 300 on the 10th, the day of death. In yet another case seen recently the patient's serum showed a mere trace on the 8th day but was positive 1 : 300 three days later, when heart blood was taken as the patient was actually breathing his last.

We have been quite unsuccessful when attempting to demonstrate the leptospira in patients' urine. It should be possible to do this for varying lengths of time after the first week; but the urine must be freshly passed and neutral in reaction.

Personal Diagnostic Experience

With growing familiarity with the disease an increasing number of cases are diagnosed early. About 70% of our cases were suspected within forty-eight hours of being seen. Some of these cannot qualify as early cases as they did not reach us until late in the illness. Nearly 50% of our cases have been diagnosed within the first four days of the illness and specific treatment started. We believe that this facility in diagnosis is rapidly achieved after quite brief contact with the condition: succeeding house-physicians very rarely failed to detect suspicious cases, and after leaving our district they continued to make the diagnosis with accuracy in other places.

Dr. Broom, in a personal communication, mentions that he has on a number of occasions noticed that positive sera have been received in his laboratories from districts where previously the infection had not been noted, only to find that these sera have been sent to him by doctors who had worked as colleagues with us in this district.

Treatment

Writer after writer has lamented that specific treatment in the early stage of the illness is almost impossible because of diagnostic difficulties. Hutchison, Pippard, Gleeson-White, and Sheehan (1946), record the treatment with penicillin of 6 out of 17 cases appearing in British soldiers in Italy. They state that "unavoidably penicillin could not be started in the pre-icteric stage, but between the 6th and 10th days of the illness." In 1934 Davidson *et al.* wrote: "Hence it appears to us that the clinical diagnosis in the early stage, before jaundice occurs, presents almost insuperable difficulties. Accordingly the full benefit of serum treatment is unlikely to be realized."

Of our cases 12 have been given specific antileptospiral serum during the first four days of the illness, and one other received penicillin within the first two days. In this group there has been no mortality. This compares favourably with the remainder of our cases—about a score—none of which received treatment until after the fourth day, and among which there were six fatalities—a mortality of 30%.

The story of one very severe case seems to support our impression that serum given early can influence the infection.

In October, 1942, Mrs. F., aged 20, who had had an attack of abortus fever ten months previously, was admitted after three days' high fever. She was very ill, and our investigations seemed to support our suspicion that she was suffering from Weil's disease. Intensive intravenous serum treatment was started at once. She became jaundiced two days later, and finally anuric with a blood urea of 295 mg. per 100 ml. Certain special measures, which will be referred to later, were instituted in an attempt to re-establish renal function. These were successful. She had received 480 ml. of serum, all given intravenously. A week later there was an abrupt rise of temperature with clinical deterioration. The titre of her abortus reaction rose steeply, and it was thought that possibly her old infection had been reactivated. Consequently she was treated with intramuscular "soluseptasine." As this failed to produce the usual rapid reduction of the fever we were driven to the conclusion that her relapse represented the commonly seen secondary rise of Weil's disease. She was desensitized and further intravenous serum given—in all 280 ml. Her fever fell by crisis in twenty-four hours, and she gave no further anxiety.

Penicillin

Alston and Broom (1944) reported that nine strains of *L. icterohaemorrhagiae* and one of *L. canicola* were found to be sensitive to penicillin *in vitro*, and that penicillin exerted a protective action in guinea-pigs infected with leptospira provided treatment was started within twenty-four hours of infection.

Lloyd Hart (1944) reported the rapid disappearance of organisms from a patient's urine after the use of penicillin given late in the illness; and Baldry, in a personal communication, stated that a severe case was treated with penicillin rather late in the illness, apparently with immediate improvement, followed by deterioration when penicillin was withdrawn, and subsequent complete recovery consequent upon the re-establishment of penicillin treatment in larger doses. In the Italian cases already referred to the workers were not impressed by the effect of penicillin given in the icteric stage.

On July 24, 1945, a boy aged 8 years was sent into hospital as a suspected case of Weil's infection by Dr. Loveless, of Stockbridge. He had been ill for forty-eight hours. Our own examination and investigations proved the suspicion to be correct by the finding of a strongly positive agglutination reaction. Penicillin in 20,000-unit doses was given every three hours from July 24 to 28. The boy's temperature, which was 103° F. (39.4° C.) on admission, was normal within twenty-four hours. His blood urea, which had been 65 mg. per 100 ml. on admission, had fallen to 35 mg. by the 29th, and he was discharged from hospital in full health on Aug. 1. No observations of any importance were subsequently made.

Little can be judged from a single case, but it should be noted that the infection appeared to be a severe one, as judged both by the clinical condition and by the blood urea level of 65 mg. per 100 ml. within forty-eight hours of the onset. Furthermore, in spite of this, his fever lasted only three days, as compared with the usual five or six days, and he developed no icterus. One was certainly left with the impression that a severe case had made an unexpectedly rapid recovery. Penicillin was given to two other late cases, when icterus had been established for several days and nitrogen retention had become extreme, with no suggestion of benefit. In one other case, mentioned on page 812, penicillin was given on the sixth day after serum had failed to influence an unusually prolonged febrile stage. The temperature fell by crisis, but there was no clinical improvement, and the boy died the next day, non-icteric.

A farmer of 53, seen in October, 1946, had been treated with 50,000 units of penicillin every four hours from the second day of an acute febrile illness. He became anuric on the seventh day and secreted no urine for 36 hours. Clinical jaundice was not present. When I saw him, on the ninth day, diuresis had set in and his temperature had subsided. A petechial rash, haemorrhagic herpes, and slight conjunctival icterus suggested that he was suffering from Weil's disease. His blood urea on that day was 250 mg. per 100 ml. and he had an icteric index of 11 units. His blood agglutinated leptospira up to a dilution of 1:1,000. There was no further rise in his icteric index, and he has made a good recovery.

The importance of this case appears to be the suggestion that the penicillin had protected his liver while failing to prevent

the renal complications. We have never seen blood urea figures approaching 250 mg. in any case which was not frankly jaundiced, except for the fatal case reported in this paper.

These observations, taken with the experimental evidence reported by Alston and Broom, strengthen our belief that, provided it can be used during the early septicaemic stage and that it is used freely, we have in penicillin a specific of probably greater usefulness than serum. It may well be that the best results will be obtained by a combination of both agents.

Other Points about Treatment

In addition to the questions relating to specific treatment, a number of observations have been possible with regard to the more general aspects of treatment. Immediately a diagnosis has been made—indeed, when it remains only a suspicion—the patient should be put on a low-protein diet. Fluids should be pressed and glucose used freely. The urine should be rendered alkaline by the use of potassium citrate, and a very careful intake and output record should be kept for each twelve hours. At the first sign of a falling output more drastic measures to overcome this should immediately be started. We have found valuable the free use of 50% glucose intravenously, and it is our habit to give 50 ml. every eight hours. We have not hesitated to employ continuous intravenous drip methods, using saline, glucose-saline, plain glucose, and sodium sulphate, great care being taken to maintain a proper salt balance in order to avoid pulmonary complications. This last is of particular importance, as the bad cases have frequently shown pulmonary congestion, and even consolidation, quite apart from intravenous therapy. We have used heat and even short-wave diathermy to the renal areas, and have brought heat to the kidneys from in front by means of hot colonic irrigation as suggested by Hamilton Fairley.

Finally, we have in three desperate cases attempted by the use of high spinal analgesia to re-establish renal function by invoking sympathetic release. In each of these three cases the anuric state gave place to secretion following the spinal analgesic. In one—Mrs. F., already referred to—this went on to full renal function and complete recovery; but in the other two, both of whom showed blood urea figures of over 500 mg. per 100 ml., in spite of restarting secretion recovery did not follow. One of these men excreted 30 oz. (0.85 l.) of urine on the day before death, and his blood urea had fallen.

The value of high spinal analgesia in certain cases of anuria was well shown in the case of a 5-year-old girl who had sustained an extensive third-degree burn of the thigh. Five days after her accident she was found to be completely anuric and her blood urea had reached 520 mg. per 100 ml. Three days later, after complete failure of all other methods of treatment, high spinal analgesia was induced, with subsequent re-establishment of renal function and ultimate total recovery. In using this drastic method of treatment anxiety is bound to be experienced, as these cases invariably have a very low systolic pressure. Figures as low as 70 mm. Hg systolic have been seen. We have used injections of ephedrine before and during the treatment. In future we propose to use this method earlier in the threatening cases rather than leave it as a last almost hopeless attempt to save life.

It seems clear that the anuric state seen in the more severe cases will have to be regarded as an example of what Maegraith and others (1945) have called the "renal anoxia syndrome"; the appearance, naked-eye and microscopical, of the kidneys in fatal cases being to all intents and purposes identical with that seen in conditions such as crush syndrome, blackwater fever, incompatible blood transfusion, and so-called traumatic uraemia.

The part, if any, played by spinal analgesia or splanchnic block in the therapy of this condition is not as yet clear, but it should be recalled that in discussing this syndrome following trauma Trueta suggests the possibility that vascular spasm is in part responsible. Our results with spinal analgesia would seem to support this suggestion.

Serum Diagnosis

The final diagnosis in our cases has always rested upon the demonstration of agglutinins, if possible in rising titre, in the patient's blood. It has been suggested from time to time that where specific serum has been given this may influence such investigations, possibly falsifying diagnosis. This possibility is freely admitted, though in 1934 Schüffner, speaking of individuals incorrectly treated with serum and later proved not to be suffering from leptospiral infection, stated that in these people the agglutination reaction remained negative.

Alston (1940) carried out an experiment with rabbits in an attempt to determine the fate of specific antileptospiral serum. In four animals used, a positive agglutination reaction was obtained immediately after a test dose of serum. The titre of this reaction subsequently fell rapidly, and at the end of 120 hours antibodies could no longer be detected. In an attempt to repeat this experiment in the human subject 100 ml. of antileptospiral serum was injected intravenously into a patient suffering from influenza. Blood was tested for the presence of agglutinins at intervals of five minutes, one hour, twelve hours, and twenty-four hours after the serum injection. Though they were present in considerable concentration at five minutes and one hour, there was a steep reduction at twelve hours, and at twenty-four hours they had almost disappeared from the blood. In our case a dose equivalent to about three times the dose used by Alston, and considerably in excess of the usual therapeutic dose, was given, while the fall in titre seems to have been even more rapid than in the animal experiment. If more than one test is carried out, and a rising titre is obtained, we feel that this possibly disturbing factor in diagnosis can be safely discounted.

It must be remembered that a previous infection may be responsible for a positive agglutination reaction. Our first two cases had positive agglutination three and four years respectively after their illness, though not in high dilution. In such a case a rising titre would be required to establish the diagnosis, though, so far as we know, no case of second attack has ever been recorded.

Schüffner's often-quoted dictum, that where there is no icterus there is no mortality in this illness, is almost invariably correct. Indeed, we can find no reference to any fatal non-icteric case from the British Isles. This makes the following story seem worthy of mention:

In November, 1944, a boy of 15 was admitted to hospital on the surgical side with a tentative diagnosis of acute appendicitis. He had then been ill for three days and his temperature was 103° F. (39.4° C.). His white cell count showed 4,700 leucocytes with a normal differential count. His temperature was maintained, and three days later we were asked to see him as he had developed a generalized rash, and the question of measles had been raised.

Upon examination he was clearly very ill. The rash was morbilliform and generalized, but the buccal mucosa showed no changes. Furthermore, he had had measles three years before. His white cell count had risen to 12,700, with 95% of polynuclears. His blood urea was 73 mg. per 100 ml., and the icteric index 4 units; the urine showed a cloud of albumin only.

This was now the sixth day of his illness and blood was sent to Dr. Broom for testing. This first sample gave a very weak positive reaction at 1:10. Serum treatment had been started at once, but the boy's condition had deteriorated by the next day and his blood urea had reached 146 mg. per 100 ml. His temperature showed no sign of falling. Penicillin was substituted for serum, and though his temperature became normal in about 12 hours he continued to go downhill, and died on the eighth day of illness.

Two subsequent agglutination tests were both positive at 1:10 and 1:30 respectively. At no time was any suggestion of jaundice noticed, and his icteric index remained within normal limits.

Dr. Broom, in a personal communication, says that he has sometimes seen guinea-pigs infected with leptospira die very quickly and without the development of either jaundice or haemorrhages, as if they had been overwhelmed by the toxaemia before there had been time to develop the usual signs. Such, we feel, must have been the experience of this boy. Unfortunately it was not possible to carry out a necropsy in his case.

Weil's disease is not included in the schedule of diseases which call for notification under the Industrial Diseases Act in England, but in cases where it is possible to establish that the victim contracted his infection while at work the employer's liability under the Workmen's Compensation Act is obvious. In one of our fatal cases, that of a farm labourer who had been employed in thatching ricks about the time when he probably became infected, the judge in the Winchester County Court supported the claims of the appellants, and the man's widow

was granted a considerable sum in compensation for the loss of her husband. In two subsequent fatal cases, and under almost identical circumstances, it appears that the insurance companies concerned do not propose to question their liability, though a careful scrutiny of the cases has been made from the diagnostic aspect. Thus the need for solid and unquestionable diagnosis in these cases becomes of more than purely medical and scientific interest.

Since the writing of this paper Williams has treated a severe case of Weil's disease in a man of 53, deeply jaundiced, oliguric, and with a blood urea of over 300 mg. per 100 ml., by methods devised to raise the blood pressure—intravenous plasma and injections of ephedrine, combined with high spinal analgesia. The result was dramatic. There was no further increase in blood urea, and within twelve hours a considerable diuresis had been established which went on to a veritable deluge, with rapidly falling blood urea and uninterrupted recovery. This case, as judged by all the standards which our experience in the past had led us to accept as of importance prognostically—age, depth of jaundice, degree of nitrogen retention, and absence of early specific treatment—caused us to predict a fatal outcome. This prognostication was triumphantly disproved by the course of the illness.

No case has come under our care since the publication of Zondek's (1946) stimulating paper on extrarenal azotaemia and extrarenal uraemia, so that we have had no opportunity of investigating his suggestions with regard to Weil's disease, though we have fully confirmed his findings in severe gastro-intestinal bleeding and relapsed pernicious anaemia, in which the normal relationship between the urea and chloride excretion has been grossly disturbed in the direction of relatively reduced chloride excretion. Nevertheless, we feel confident that his findings would almost certainly be available in these cases, as the urea content in the urine of oliguric patients has always been above 2%.

Our observations in this disease lead us to believe that the mechanism of cortical renal ischaemia, as described by Trueta and others (1946), is of great importance in the aetiology of the syndrome of water and nitrogen retention seen in the more severe cases of this infection, and the explanation of the apparent success of spinal analgesia in these cases becomes more easily understandable. This work appears to emphasize the need for earlier use of this method of treatment in oliguric cases.

I would like to record again my sense of indebtedness to Dr. J. C. Broom for all his help and encouragement in this work. Dr. Wrigley, Honorary Pathologist, Royal Hampshire County Hospital, has been responsible for all the other pathological work done in our cases, and my sincere thanks are due to him. I am most grateful to numerous house-physicians for their help, and to the local practitioners who have been responsible for referring cases to me.

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In pursuance of the statutory procedure under the Factories Act, 1937, the Minister of Labour and National Service proposes to make, under Section 65, regulations entitled the Dangerous Occurrence (Notification) Regulations, 1946. The Dangerous Occurrences (Notification) Order, 1935, which would be revoked, extended the provisions with regard to notice of accident to the same classes of occurrences as are specified in the Schedule to these Regulations. The Order was, however, limited to factories or workshops within the meaning of the Factory and Workshop Act, 1901, and places which, for the purpose of the provisions of that Act with respect to accidents, were a factory or workshop or were part of the factory or workshop. The proposed Regulations require notification of the same classes of occurrences happening in factories as defined in the Factories Act, 1937, or in premises or places, or in the carrying on of processes or operations or work, to which Part V of that Act (which relates to the notification and investigation of accidents and industrial diseases) is applied by Sections 103 to 108. Copies of the Regulations may be had from H.M. Stationery Office or through any bookseller, price 1d.

AN UNUSUAL CASE OF WEIL'S DISEASE

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Evidence is accumulating which indicates that Weil's disease is not rare in this country. Gardner and Wylie (1946) report that over the past six years they have examined 182 sera which gave positive serological evidence of Weil's disease, and also that in various laboratories throughout Great Britain and Northern Ireland 488 cases have been serologically diagnosed during this period. It is probable that many mild and anicteric cases have escaped diagnosis. The present case is being recorded in order to stress the need to consider Weil's disease in the differential diagnosis of any case of jaundice or nephritis, and to report the occurrence of the clinical syndrome of bilateral adrenal haemorrhages in Weil's disease.

Case History

The patient, a heavily built man aged 56, was a butcher living in a village twenty miles from Manchester. For some days before the onset of his illness he had felt unusually tired, but continued normally with his work. On Oct. 25, 1945, he had a severe frontal headache, and the next day, having developed a high fever, he sought medical advice. On Oct. 29, the fever having persisted, a course of sulphapyridine was started, a total of 16 g. being given in four-hourly doses. On this day he began to vomit frequently, and, in his own words, "it has been a case of drink and vomit since." The vomitus became greenish black with a foul smell, and was described by a visiting relative "as if his motions were coming up the wrong way." In view of the vomiting it is difficult to say how much of the sulphapyridine was retained. On Oct. 30 jaundice started, and the patient was troubled by a persistent hiccup. No urine had been passed since Oct. 28, apart from a few drops of blood-stained fluid, and he had been constipated throughout the illness except for a small dark stool on Oct. 30.

The patient was admitted to the Manchester Royal Infirmary on the evening of the 31st, and died twenty hours later. On admission he was mentally clear but extremely anxious; retching and hiccup were frequent, and he complained of an intense thirst. The temperature was 96° F. (35.6° C.), pulse 130, and respirations shallow at 30 to the minute. On examination the most striking feature was jaundice. There was severe circulatory collapse, the pulse was thready, the extremities were very cold, and the systolic blood pressure was only 80 mm. Sweating was profuse yet dehydration was severe. The tongue was dry but clean, and the conjunctivae were congested. The pupils were constricted, probably as a result of morphine given before the journey to hospital.

Examination of the abdomen revealed numerous small purple petechiae on both flanks. No marked distension or rigidity was observed, but there was great tenderness. The liver was not felt—in fact, it seemed as if the area of liver dullness was diminished. No significant physical signs were found in the chest or central nervous system. A provisional diagnosis of acute hepatic necrosis or hepato-renal syndrome was made. Soon after admission it was pointed out that, apart from the jaundice, the general picture suggested acute adrenal insufficiency as in the Waterhouse-Friederichsen syndrome. There was also the possibility that the sulphapyridine administered might be implicated to some degree. Intravenous glucose-saline was given; unfortunately cortin was not available. The white cells numbered 14,200 and the haemoglobin was 13.5 g.%. The next morning he passed half an ounce (14 ml.) of urine, but the state of circulatory collapse continued.

The possibility of leptospiral infection was meantime considered and blood was taken for serological and biochemical investigation. The patient now lapsed into a state of muttering delirium, the pulse weakened and became imperceptible, the temperature rose to 100° F. (37.8° C.), and he died twenty hours after admission.

Laboratory investigations on Nov. 1 showed: W.B.C., 10,600 per c.mm. (polymorphs 76.5%, lymphocytes 10%, monocytes 3.5%, eosinophils 0.5%, myelocytes 6%, metamyelocytes 3%, Türk cells 0.5%, plasma cells 1%, nucleated R.B.C. 5/100 W.B.C.). Haemoglobin, 12.1 g. %. Blood urea, 270 mg. per 100 ml. Whole blood chlorides, 316 mg. per 100 ml. (as NaCl). Serum colloidal gold reaction: 2332110000. Van den Bergh test: immediate direct reaction with maximum colour in two minutes (bilirubin 32 mg. per 100 ml.). Serum proteins: albumin, 3.2 g. %, globulin, 3 g. %. Urine: centrifuged deposit showed numerous red cells and pus

cells, renal epithelial cells, but no casts. No leptospirae could be found on dark-ground examination, but the urine was examined after some delay.

Serum for agglutination against *Leptospira icterohaemorrhagiae* was sent to the Reference Laboratory at Oxford. The result showed a positive agglutination in a dilution of 1/400; the reaction was a partial agglutination, atypical microscopically.

The necropsy was performed twenty-two hours after death; the report was as follows (Dr. Susman):

Lungs: scattered haemorrhages in both pleurae; both lungs distended with fluid; many haemorrhages throughout. Stomach: scattered haemorrhages over the mucosa; massive haemorrhage involving five to six feet (1.5–1.8 metres) of the terminal ileum. Liver: enlarged; yellow colour throughout; no macroscopic necrosis; biliary pathway normal. Spleen: enlarged; brick-red colour. Adrenals: bilateral enlargement; complete disorganization by extensive haemorrhages. Kidney: abundant pelvic haemorrhages; fresh fatty degeneration.

Histological Findings.—Liver:—There were dissociation and loosening of the hepatic cells, scattered areas of fatty degeneration, and areas of hepatic regeneration with enlarged and binucleated liver cells. No leptospirae could be found on sections stained by the Levaditi technique. Kidney:—There were a few hyalinized glomeruli, some tubular necrosis, scattered foci of polymorph and lymphocytic infiltration, and many dilated blood vessels. Sudan IV section failed to reveal fatty degeneration, but sections stained by the Levaditi technique showed many leptospirae, particularly around the tubules.

The finding of spirochaetes in the kidney but not in the liver, and the rarity of the organisms in the liver, were commented upon by Ashe *et al.* (1941).

Discussion

The clinical history of a febrile disturbance followed by severe renal and hepatic failure accompanied by a haemorrhagic rash, associated with the laboratory and necropsy findings, proves the diagnosis of Weil's disease. The hepatic and renal failure noted in this case has been the subject of previous comment. Ashe *et al.* (1941) speak of a hepato-renal syndrome in the disease; Walch-Sorgdrager (1939) refers to the frequent misdiagnosis of acute yellow atrophy; and Davidson *et al.* (1934) consider the association of jaundice and nephritis of great diagnostic value. The presence of an atypical agglutination of 1/400 against leptospirae is probably explained by the fact that the reaction was performed early in the disease, and in those cases terminating fatally the development of antibodies may be delayed.

This case, with severe peripheral collapse, cold extremities, a low blood pressure, and profuse sweating, resembled clinically the acute adrenal apoplexy of the Waterhouse–Friederichsen syndrome. That syndrome occurs classically in meningococcal meningitis or meningococcal septicaemia, and, so far as we know, this clinical picture has not been reported in Weil's disease, though bilateral adrenal haemorrhages are a common necropsy finding (Ashe *et al.*, 1941).

Gardner and Wylie (1946) found that 3.3% of their 182 cases were in butchers, but did not specify the actual work done by these men. Our case is interesting in that it occurred sporadically in a butcher who did not frequent slaughterhouses or kill his own cattle. A case has been reported in which the infection was derived from meat that had been contaminated by rat urine, and the disease is a known hazard of slaughtermen (Walch-Sorgdrager, 1939).

In order to pursue the epidemiological aspects further, two rats were obtained from behind the patient's home and close to a small stream. On post-mortem examination they were normal, but leptospirae were seen in the kidney on sectioning and staining by the Levaditi technique. The kidneys of the rats were ground up and injected into guinea-pigs, and the latter died on the ninth and tenth days, presenting at necropsy the typical appearances of Weil's disease. They showed jaundice, haemorrhages into the lungs (butterfly appearance), kidneys, and adrenals, and on section the kidneys, liver, spleen, adrenals, and lungs contained numerous spirochaetes. Weil's disease, which is mild and asymptomatic in rats, has an incidence of between 10 and 30% in wild rats in this country, and it is highly probable that infection in the present case was derived from the local rat population.

The death rate in Weil's disease has been variously put between 4 and 48% (Walch-Sorgdrager, 1939; Wood, 1943), but as more of the milder cases come to be diagnosed it is probable the death rate will fall. It is interesting that most of those who die from the disease have severe renal failure, with associated uraemia and oliguria (Wood, 1943; Hutchison *et al.*, 1946), and the case presented here was no exception to this rule.

Summary

A case of Weil's disease occurring sporadically in a butcher and presenting the clinical signs of acute adrenal insufficiency is described. The importance of considering Weil's disease in the differential diagnosis of jaundice and nephritis is stressed.

We acknowledge our gratitude to Dr. W. Brockbank for permission to publish a report of this case.

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GRAVITY DRAINAGE IN THE PRONE POSITION IN TREATMENT OF DIGESTIVE FISTULAE OF THE ABDOMINAL WALL

BY

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A fistula of the abdominal wall which communicates internally with a segment of the alimentary canal rich in digestive juices (e.g., duodenum, jejunum, ileum, and to a lesser extent caecum), or with a digestive gland (e.g., pancreas), may constitute a sore trial to the patient and a test to medical and nursing attendants. The special feature of these cases is the digestion of the skin which occurs around the fistula, often to a considerable distance. When the discharge is abundant it may flow round to the back and down to the groin and crutch, so that areas of skin outside the abdominal wall may also be digested. The raw digested skin is extremely painful and sensitive, and a patient with an extensive digestive fistula is usually miserable and his appetite and sleep are upset. From these causes alone, quite apart from any nutritional loss from the fistula, his general condition may progressively deteriorate, and a vicious circle be set up that may preclude the direct surgical attack which alone can cure the fistula. Minor digestive fistulae may lend themselves to treatment by the application of protective or neutralizing pastes and ointments to the abdominal wall: a rather more severe fistula may be successfully treated by some suction method of removing the digestive juices as they exude; but for a real pouring digestive fistula all these methods usually fail.

We have successfully treated a number of cases of this type during the past few years by gravity drainage in the prone position. As this method of treatment of digestive fistulae does not seem to be widely known, we have thought it worthwhile to record the method, together with some practical points of importance and a review of four cases.

Case I

The first case was the most dramatic, and it was in this one that the method was worked out. It was that of a schoolboy, aged 15, who was admitted on March 7, 1943, from another hospital to the care of Surg. Rear-Admiral Sir Gordon Gordon-Taylor. Three months previously his gangrenous appendix had been removed. Small-gut obstruction and pelvic abscess formation had followed, for which ileostomy was performed. Subsequent attempted closure failed, and a further laparotomy revealed sloughing of coils of small gut which later formed three other spontaneous jejunal fistulae. His condition when first seen was extremely bad. He was distressingly emaciated (weight, 5 st. 3 lb. = 33.1 kg.), while on to the abdominal wall, raw and semi-digested from costal margin to pubis

quantities of fluid and semi-solid intestinal contents discharged, and the mere approach of a medical attendant caused screams of apprehension. At the same time the boy was ravenously hungry, as meals were erupted together with succus entericus on to his abdomen within half an hour of ingestion. During the two days following admission a variety of nursing methods applicable to intestinal fistulae were unsuccessfully adopted. Protective pastes would not adhere to the abdominal wall, oiled-silk sheeting failed to maintain watertight connexion with the indrawn mouths of the fistulae, while mechanical suction was subject to obstruction from semi-solid matter and prolapsed intestine and was unable to cope with sudden peristaltic rushes. Local percaine application did, however, alleviate his pain. Meanwhile a large sacral sore was also causing much distress, and the decision was taken to nurse the patient in the prone position on slings in the hope that the sore would be given an opportunity to heal, and that simultaneously the intestinal contents would discharge downwards from the stomata without further irritation and digestion of the parietes.

Although the success of this measure was immediately evident, the uneven weight distribution with the slings proved uncomfortable to the patient's back. The carpenter then made a special wooden frame. But finally the method described and illustrated was evolved and the boy lay in the prone position day and night almost without interruption for nearly three months.

The improvement of his condition was striking. Six pounds (2.7 kg.) in weight was gained in six days. The abdominal wall began to heal, and it was interesting to note that the intestine prolapsing through hitherto recessed openings formed valves which assisted in slowing the intestinal emptying time, thus aiding nutrition, and occasional rectal motions were achieved. By June 3 his weight was 6 st. 7 lb. (41.28 kg.). Operation, consisting of multiple resection and anastomosis, was possible, and with saline, glucose, plasma, blood, and sulphamezathine preparation this was successfully performed by Sir Gordon Gordon-Taylor. When last seen in February, 1944, the boy was in excellent health and spirits.

Case II

This patient was a man aged 49 on whom laparotomy had been performed with a view to resection of a gastric ulcer. Owing to the size, difficult access, and adhesions it was decided to do a jejunostomy instead, by cutting across the jejunum and making an anastomosis in Y, bringing the cut distal end out through the abdominal wall. Owing to the extreme regurgitation of digestive juices the jejunostomy was not a technical success. The abdominal wall, groins, and back became very raw. The patient was nursed in the prone position, when the condition of the abdominal wall at once improved and it was found possible to maintain the jejunostomy feeding for nearly five months. It was then operated on uneventfully and closed.

Case III

This man, aged 25, had a terminal ileostomy performed in May, 1943, for acute ulcerative colitis with haemorrhage which had failed to respond to medical treatment. The abdominal wall became badly digested from the discharges from the ileostomy. Treatment in the prone position rapidly cleared up the condition of the abdominal wall. The patient died in November, 1943, after operation for intestinal obstruction, but the condition of the abdominal wall had in the meantime been satisfactorily controlled by nursing in the prone position.

Case IV

This patient, a man aged 34, also suffered from ulcerative colitis which had failed to respond to medical treatment. Terminal ileostomy was performed in June, 1945, and again there was much digestion of the abdominal wall by the small-intestine discharges. Treatment in the prone position was successfully adopted, and was carried out with intervals over several months. At the end of this time the ileostomy discharge was semi-solid and much less irritating. Subsequently total colectomy was successfully performed. In this case the prone position did lead to a moderate prolapse of the ileostomy, up to about 6 in. (15 cm.) protruding, but this went back when he was able to resume the supine position.

Some Practical Points

The accompanying illustration shows the arrangement of the bed and mattresses that was found to be the simplest and most efficient. The mattress at the head of the bed is the top third of a divided mattress, and that at the bottom an ordinary mattress folded as illustrated so that the dorsa of the feet are comfortably supported. A flat tray can thus be introduced between the two mattresses to catch the discharges. In addition pillows may be arranged round the division in the mattresses to suit the comfort of the patient. He may lie in this position continuously day and night as the first case did, or may be turned back for intervals of rest. The worse the state of the abdominal wall the less he feels the inconvenience of the abnormal position in the relief it affords. In a total intestinal fistula the bowels present no problem. In a partial intestinal fistula the patient is turned when he wishes to open his bowels. The prone position with divided mattress lends itself without difficulty to the passage of urine in the male (it so happened

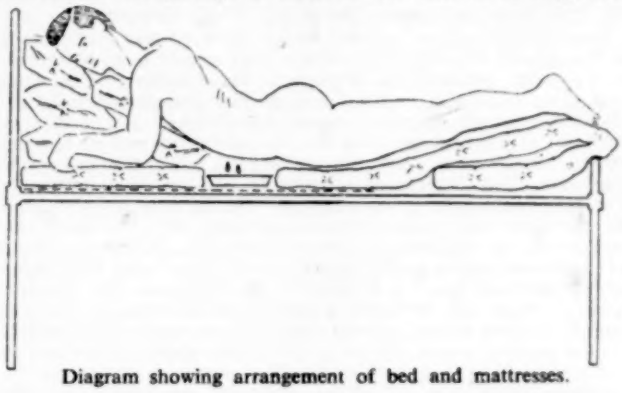

Diagram showing arrangement of bed and mattresses.

that all our patients have been males), and it should not be difficult to make suitable nursing arrangements in the female. Meals can readily be taken prone if the food is first cut up and the pillows are adjusted, the patient supporting himself on one arm and using a spoon with the other hand. Reading can be managed with a book-rest. It is best to turn the head end of the bed to the centre of the ward so that the patient sees the activities of the ward and not merely the wall.

A CASE OF CEREBRAL MALARIA IN GREAT BRITAIN

BY

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AND

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Cerebral malaria as a cause of coma is rare in Great Britain. A search of the literature has revealed only two cases in recent years (Minett and Bernfield, 1937; Sneddon, 1943), in spite of the fact that one would have expected to encounter further cases in Service personnel returning from malarious areas, especially in those repatriated by air. The following case is reported in order to emphasize two important aspects of the condition: first, that it may have to be considered as a cause of coma in this country, and, secondly, because early treatment is so essential.

Case Report

A steward in the Merchant Navy aged 26 was admitted in coma to the South Shields General Hospital at 1.30 p.m. on Sept. 8, 1946. The history, elicited from his wife, was as follows: Four days previously he had arrived in port from West Africa, having been ten days at sea. On reaching home the same day he had complained of headache and of feeling hot and shivery. He had a frequent unproductive cough and vomited after food. During the three succeeding days he had several brief severe shivering attacks and the vomiting persisted. His doctor at first treated him for influenza, but when he suddenly became unconscious, at noon on the fourth day, straightway sent him into hospital with a provisional diagnosis of malaria. A previous history of an attack of malaria three years before, with no subsequent relapses, was also obtained from his wife, and later confirmed by the patient himself.

On examination he was seen to be a man of average physique. He was in a restless, lightly comatose state, but responded to simple shouted orders and reacted to painful stimuli. He was unable to speak and was incontinent of urine. The temperature was 101.2° F. (38.4° C.), pulse 100, and respirations 28. His skin was dry and hot; no abnormality was found in the cardiovascular system and lungs. The abdomen exhibited moderate muscular resistance in the left hypochondrium, but neither liver nor spleen was palpable. Examination of the C.N.S. showed regular and equal pupils with a sluggish reaction to light; no abnormality in the fundi; normal muscle tone, no paralysis; general absence of tendon reflexes, with

a bilateral extensor plantar response; no evidence of meningeal irritation. Urine, N.A.D.

In view of the fact that he had recently been in an endemic centre of malignant tertian malaria the diagnosis of cerebral malaria was entertained. Blood films were examined and revealed a heavy infection with *Plasmodium falciparum*, numerous ring-stage parasites being present. This finding was later confirmed by Dr. Houston of the Pathology Department, Sunderland Royal Infirmary.

Treatment.—Quinine sulphate 10 gr. (0.65 g.) was given orally at 2 p.m., and the patient was able to take sips of water by mouth. Acid quinine hydrochloride 10 gr. in 10 ml. of sterile distilled water was administered half an hour later by slow intravenous injection. Rectal glucose-salines were ordered four-hourly. At 11.30 p.m. the coma was somewhat deeper and the patient was still restless and incontinent of urine. Temperature 99.8° F. (37.7° C.), pulse 108, respirations 24. He was now unable to take anything by mouth. The intravenous quinine was repeated. On the morning of Sept. 9 his condition was unchanged: Temperature 99.8° F., pulse 104, respirations 24. Neck rigidity had now appeared. Lumbar puncture was performed under local analgesia and 10 ml. of clear fluid under slightly increased pressure withdrawn. As the patient was not now retaining fluids per rectum a glucose-saline intravenous drip was started. He was still incontinent and could take no fluids by mouth. On the morning of the 10th his condition was greatly improved; he was conscious and rational, and taking copious fluids by mouth. Temperature 101.4° F. (38.55° C.), pulse 92, respirations 28. His further convalescence was uneventful, and a standard quinine-mepacrine course was instituted. On the 12th a blood film revealed no parasites; his temperature was 97.4° F. (36.3° C.), pulse 72, and respirations 20, and he was discharged home.

Discussion

In arriving at a diagnosis in this case the following points were of importance: (*a*) A recent visit to a malarious area; (*b*) history of headache, vomiting, and rigors; (*c*) sudden descent into coma. The suspicion of cerebral malaria thus aroused, coupled with absence of the clinical picture of any of the more common causes of coma in this country, led to the examination of blood films with resulting confirmation of the diagnosis.

As the clear-cut history in this instance may not be paralleled in other cases of cerebral malaria occurring in Britain, several other conditions must be considered in the differential diagnosis. The most important of these are:

1. *Meningitis* (in particular the hyperacute and fulminating forms).—The frequent occurrence of signs of meningeal irritation in cerebral malaria may confuse the diagnosis, and a lumbar puncture may be essential to differentiate.

2. *Alcoholic Coma.*—It is stated that cerebral malaria often closely simulates alcoholism. This has resulted in fatalities from misdiagnosis, and emphasizes the importance of examining blood films in doubtful cases of coma.

3. *Cerebral Vascular Accident.*—(*a*) Subarachnoid haemorrhage: In this condition severe headache followed by rapid onset of stupor or coma is characteristic, and meningeal irritation is usually well marked. Lumbar puncture, however, readily establishes the diagnosis. (*b*) Cerebral haemorrhage, thrombosis, or embolism: The production of embolism by malaria parasites may lead to various peripheral manifestations, among which hemiplegia, monoplegia, and aphasia have been described.

4. *Uraemia.*—The most likely causes of this condition in young adults are malignant hypertension and the alkali treatment of peptic ulcer associated with renal insufficiency. The onset of coma may be rapid, and prodromata equivocal. Examination of the urine, blood urea, and alkali reserve will differentiate the condition from cerebral malaria.

The present case occurred in a man who returned from an endemic area within the accepted incubation period of the disease, and illustrates the importance of considering a diagnosis of cerebral malaria in cases of coma of uncertain origin, particularly in Service personnel returning from overseas. This is especially important, as early diagnosis and adequate treatment are so essential in a disease which carries a 40% mortality in treated cases (Sanford, Crawford, and Warr, 1940). Endemic cases are unlikely to occur, as tropical strains of the malignant tertian parasite fail to survive in the mosquito at temperatures below 75° F. (24° C.) (Shute, 1945).

The dosage of quinine used in this case was somewhat higher than that advocated by Manson-Bahr (1942)—i.e., 5 to 7 gr. (0.32 to 0.45 g.)—but no untoward reactions were encountered. Intramuscular mepacrine is now being used in preference to intravenous quinine in these cases, as the likelihood of toxic reactions is even less with the former drug, but it was not immediately available for use in this instance.

Summary

A case of cerebral malaria, with recovery, occurring in Great Britain is described.

The differential diagnosis is discussed.

The importance of early diagnosis and prompt adequate treatment is emphasized.

Our thanks are due to Dr. W. Campbell Lyons, M.O.H., South Shields, for permission to publish this case; to Dr. Houston, Pathology Department, Sunderland Royal Infirmary, for his report on the blood films; to Dr. N. Strang, deputy medical superintendent, who allowed us to treat the case in his ward; and to Dr. W. Downing, South Shields, who referred the case to us.

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KALA-AZAR WITH ONSET OF SYMPTOMS IN GREAT BRITAIN

BY

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In view of the return to Britain of many of our soldiers from the shores of the Mediterranean, where kala-azar is endemic, the following case may be of interest. It serves to illustrate the fact that symptoms of kala-azar may not appear for the first time until the patient reaches this country, when the disease may simulate a primary attack of malaria.

Case History

The patient, a man aged 29, served as a soldier in North Africa and Italy for 3½ years. During that time he had no symptoms of illness. He returned to England and was apparently well for four months. On April 18, 1946, he noticed small lumps in both groins, and the next day an attack of shivering and sweating began. He continued having one of these attacks each day, but in spite of them felt quite well. Apart from slight initial nausea his appetite remained good and there were no other symptoms. On April 27 he was sent into hospital as a case of primary malaria.

On admission his general condition was fair. He had a sallow complexion (this became dusky later in the disease), and his tongue was brown and furred. A soft swelling was palpable in the left hypochondrium, extending for three or four fingerbreadths below the costal margin. It was of an indefinite outline, and was first noted as "? kidney; ? spleen." The liver edge was not palpable at this stage. The inguinal glands were felt to be slightly enlarged. The heart, lungs, and C.N.S. were normal clinically. Temperature, 101.2° F. (38.4° C.); pulse, 104; respirations, 22. During the first week after admission to hospital the patient had an intermittent high pyrexia reaching 102°–103.8° F. (38.9°–39.9° C.), with daily rigors and sweating. Occasionally there were two spikes of temperature during the 24 hours. He continued to "feel fine." By April 30 the mass in the left hypochondrium had increased in size and was obviously the spleen. The liver edge was also palpable for two fingerbreadths below the right costal margin. Skiagrams of the chest showed some congestion at the right costo-phrenic angle (presumably due to the enlargement of the liver); otherwise the chest was clear. A blood count showed: white cells, 2,140 per c.mm. (polymorphs 68%, lymphocytes 29%, monocytes 2.5%, eosinophils 0.5%); red cells 3,650,000 per c.mm.; Hb, 70%; C.I., 0.95. Repeated blood smears were negative for the malaria parasite. The urine showed no abnormality and the diazo reaction was negative.

As a diagnostic measure, starting on May 1, a course of two days' quinine 10 gr. (0.65 g.) t.d.s., followed by three days' mepacrine 0.1 g. t.d.s., was given, with no effect on the temperature. This was followed by penicillin injections (15,000 units three-hourly for 8 days), which proved equally ineffective. On May 2 agglutination tests on the serum were negative for typhoid, paratyphoid, dysentery, and *Brucella abortus* and *melitensis* organisms. Many dilutions were used with the *Br. abortus* to exclude the possibility of a zone reaction. A blood Wassermann reaction was also negative. On May 14 a formol-gel test was strongly positive. The next day a sternal puncture was performed and a few Leishman-Donovan bodies were found in the smear. An inguinal gland puncture, however, did not reveal any parasites in the stained film.

A course of 21 injections of "anthiomaline" (a 6% lithium antimony thiomalate solution containing 16% of antimony) was given

from May 18 onwards, starting with 2 ml. I.M. on alternate days, the dose later being increased to 4 ml. Iron was given for the anaemia. The temperature swing gradually diminished in height, and became normal and remained so after the nineteenth injection (June 22). Clinically there was marked improvement, with cessation of sweats and diminution in the size of the spleen, and the white blood cells showed a steady increase. Blood counts were as follows. June 3: white cells, 1,460 per c.mm. (polymorphs 44%, lymphocytes 48%, monocytes 8%). June 13: white cells, 2,180 per c.mm. (polymorphs 29%, lymphocytes 62%, monocytes 9%). July 2: white cells, 4,660 per c.mm. (polymorphs 45%, lymphocytes 52%, monocytes 3%); red cells, 3,750,000 per c.mm.; Hb, 78%; C.I., 1.04.

Discussion

The diagnosis was that of a febrile disease with splenomegaly and leucopenia occurring in a patient returning from the Mediterranean area. Malaria was excluded by blood smears and the therapeutic test of quinine and mepacrine administration, enteric and undulant fever by the agglutination tests, and pulmonary tuberculosis by the chest skiagrams. Kala-azar was suggested strongly by the formol-gel test of Napier and confirmed by finding Leishman-Donovan bodies on sternal puncture. This was preferred to splenic puncture, which entails a risk of haemorrhage.

The long incubation period should be noted. It is stated variously to be from 1 to 6 months, but cases may occur 1½ years after exposure. As modern treatment with antimony has altered the mortality from 80% to a much lower figure the importance of early diagnosis is obvious. In 1944 the *Bulletin of War Medicine* remarked that a few proved cases of kala-azar had already been seen in this country among returning soldiers, and Thompson (1944) quoted a case occurring in an English seaman. Armstrong (1945) also described two examples of asymptomatic kala-azar in soldiers.

I am indebted to Dr. E. James, medical superintendent, for permission to publish this note, and to Mr. D. Butler for help with the laboratory investigations.

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Medical Memoranda

"Purpura Provocata" in Pellagra

During the time we acted as medical officers in prisoner-of-war camps in the Netherlands East Indies a great number of cases of pellagra in all its variations were observed. The purpose of this article is to draw attention to the occurrence of purpura as a specific symptom in these cases.

One of the best-known symptoms of pellagra is erythema, which shows a predilection for parts of the body exposed to the sun. The erythema may be pronounced, but usually does not lead to purpura. On the contrary, purpura may precede it, and has been known to occur on the site of subsequent erythema. What we wish to emphasize is that the purpura should not be considered a severe form of erythema.

Purpura is a specific symptom *sui generis*. It occurred not only along the whole course of the alimentary tract but also in the skin. Only in a minority of cases was hyperaemia with dilated capillaries of the lip mucosae and gums observed. It should be mentioned that bleeding of the gums hardly ever occurred, and in these rare cases it was often doubtful if it was due to vitamin C deficiency or to pyorrhoea, etc. Purpura, often responding to administration of vitamin C, was particularly common in the early days of imprisonment. To attribute the whole illness to vitamin C deficiency because of the coincident occurrence of purpura is obviously incorrect. In our opinion the purpura we observed belongs to the pellagra group of symptoms; but this will be discussed later.

The first case occurred in an officer, thin, pale, without internal symptoms, suffering from petechiae of the lower legs. He had been "punished" the previous day by the Japanese and had to stand to attention for seven hours. We made a diagnosis of "orthostatic thrombocytopenic purpura," fully aware that this was an unsatisfactory designation. Very soon it became clear that the petechiae, particularly on the lower legs and lower arms, should be regarded as one of the initial symptoms of pellagra. The linear distribution was striking. Haemorrhagic stripes even to a length of 10 in. (25 cm.) occurred, particularly if the patient was exposed to the sun, the linear form being due to scratching because of lice or scabies. Indeed, in all cases purpura could be produced artificially by scratching the skin with the finger or a pencil, similar to Nikolsky's bullous phenomenon in pemphigus or Köbner's phenomenon in psoriasis and lichen ruber; purpura followed, however, the same day. Exposure to the sun accelerated the phenomenon.

It should be pointed out that purpura provocata in pellagra is not identical with Rumpel-Leede's phenomenon, in which haemorrhages occur *distal* to the tourniquet. In fact, both phenomena indicate the permeability of the blood vessels and the "haemorrhagic constitution." They may even be combined—e.g., in those cases of Rumpel-Leede's phenomenon in which haemorrhages also occur *under* the tourniquet. We regard this symptom as a severe form of Rumpel-Leede's phenomenon. If doubt is expressed with regard to the diagnosis of pellagrous purpura, that of vitamin-C-deficiency purpura being preferred, we would emphasize that all patients were proved to be suffering from pellagra or (as we prefer to call it) a polydeficiency. We agree with those who consider that the use of the term "pellagra" has been too restricted in the past, and that in its widest concept it embraces a poly- (or even an omni-) deficiency, in which lack of sometimes one and sometimes another vitamin dominates the syndrome.

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Adenoma of Islets of Langerhans

The following case seems to be interesting enough to merit publication.

CASE REPORT

The patient, a woman aged 59, was admitted to hospital late in the afternoon of Feb. 2, 1946. The only history was that she had sat down on the floor in the middle of a shop and refused to move.

On examination she was found to be conscious, but to all questions her only reply was: "I feel damn rotten." In the ward she was somewhat difficult to control. She was very obese, and her blood pressure was 245/140. No other abnormal signs were present. Morphine was given. By the early hours of the next morning she had quite recovered, but she could recall nothing save that she had gone out shopping that afternoon. She had had many similar attacks before and had found that they could be prevented by a cup of tea and some white bread. The attacks began in July, 1943. At that time they occurred at intervals of many months. Just before and after admission they averaged three or four a week.

During an attack her skin became cold and clammy. Her pupils were slightly dilated. Often the first warning was that she began to wink at everyone. Normally a very talkative person, she would become very quiet. Occasionally she became restless, and on one occasion threw bread crusts at some visitors. During one of these attacks her blood pressure was taken and it was found to be lower than her normal. The attacks were controlled in the early stages by giving 25–50 g. of glucose by mouth. This resulted in her recovery within five to twenty minutes. The patient was always unaware of what had happened.

Examination of the blood showed: red cells, 5,850,000; white cells, 4,200; Hb (Sahli), 105%; urea, 32 mg. per 100 ml.; Wassermann reaction, negative; B.S.R. and blood slide, N.A.D.; *x*-ray examination of skull, N.A.D.; urine, N.A.D.

Blood Sugar Estimations.—Feb. 7. 175 mg./100 ml. (four hours after a meal). Urine was negative, as it was throughout the glucose-tolerance curves. *Feb. 12.* Fasting level, 36 mg./100 ml. *Feb. 13.* Sugar-tolerance curve: fasting level, 32 mg./100 ml. 50 g. of glucose given; blood sugar after 1/2 hour, 96 mg./100 ml.; 1 hour, 117; 1½ hours, 108; 2 hours, 32; 2½ hours, 24. During an attack the reading was 19 mg./100 ml. *Feb. 15.* Fasting level, 75 mg./100 ml. *Feb. 28.* Sugar-tolerance curve: fasting level, 31 mg./100 ml. 50 g. of glucose given; blood sugar after 1/2 hour, 56 mg./100 ml.; 1 hour, 127; 1½ hours, 125; 2 hours, 80; 2½ hours, 44. The patient was quite unaware of the first blood being taken, but the 50 g. of glucose soon pulled her round.

A diagnosis of adenoma of the islets of Langerhans was made and a laparotomy was decided upon. This was done by Mr. W. J. Liddle, assisted by Dr. G. H. Moore, on March 28. A small round tumour was removed from the head of the pancreas. It was situated partly behind the duodenum, and it shelled out quite easily. A careful search was made for a possible second or third tumour but none was found. A continuous intravenous glucose-saline drip was begun before the operation. Blood was given in the theatre. An hour after her return to the ward the blood sugar was 219 mg./100 ml. The urine contained sugar the next day. The patient died on the evening of March 29. It may be added that she was conscious until shortly before death, but her breath smelt of acetone.

The tumour was 5/8 in. (1.6 cm.) in diameter; it was almost round, and firm in consistency. Section showed the presence of an adenoma of the islets of Langerhans.

I am indebted to Dr. J. R. Turner and Dr. Ison for permission to publish this report.

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Reviews

THE PERIPHERAL CIRCULATION

The Peripheral Circulation in Health and Disease. A Study in Clinical Science. By Robert L. Richards, M.D. With a foreword by J. R. Learmonth, Ch.M., F.R.C.S.Ed. (Pp. 153; illustrated. 21s., plus 7d. postage.) Edinburgh: E. and S. Livingstone. 1946.

The disciples of the late Sir Thomas Lewis will recognize in this book a monograph which deserves a place with those of the master himself in the library of clinical science. Its foundations in physiology, its substance of controlled observation, and its framework of well-informed argument combine to build a structure which is both a worthy memorial to good work and a guide to those who wish to follow the scientific method in clinical investigation and practice.

A special centre for injuries of the peripheral nerves and for diseases and injuries of the peripheral blood vessels offers abundant material for clinical research. It is clear that in order to fit himself to make the best use of his opportunities the author made a close study of the literature, and one of the chief features of the book is his critical survey of the work and opinions of his predecessors and contemporaries in the field. From the pen of many a writer such a review makes tedious reading, but Dr. Richards's care in the arrangement of his references, and his attractive literary style, have given his readers enjoyment with instruction, and the book is of special value as a comprehensive account of the literature of the peripheral blood vascular system brought up to date.

A criticism of the work might be that scant attention is paid to the various methods of studying the circulation to a limb in addition to the skin temperature—the method by which nearly all the observations recorded in this book have been made. On the other hand it is plain that skin temperature records, if properly controlled and interpreted, offer the most generally useful and the most readily available method of obtaining information about the peripheral circulation. Clearly illustrated and well-documented accounts are given of the disorders of the circulation observed in obliterative arteritis and in Raynaud's disease; and a chapter of very great interest is devoted to the vascular phenomena which accompany peripheral nerve injuries. The distinction between the early warm phase and the later cold phase in a denervated area is well drawn, and many features which have been rather obscure heretofore are explained. The book ends with a masterly description of immersion foot, and the appropriate treatment for the various stages of this distressing condition is described in some detail.

Physicians and surgeons, stimulated by the researches carried out by Lewis's school, are now taking an increasing interest in the disorders of the peripheral blood vessels. While the author does not claim this book to be an extensive treatise it will prove to be most useful to the clinician in his daily practice, as well as providing him with valuable advice about where to look for further information.

ACIDOSIS

Acidosis. Clinical Aspects and Treatment with Isotonic Sodium Bicarbonate Solution. By Esben Kirk, M.D. (Pp. 222; Dan. cr. 18.) Copenhagen: Einar Munksgaard; London: William Heinemann Medical Books.

This book is a plea for the more extended use of sodium bicarbonate in isotonic solution (1.3%) in conditions of acidosis. Acidosis is defined as a condition in which plasma bicarbonate is reduced below the normal range of 22–30 milliequivalents per litre. The symptoms vary from the fatigue of mild acidosis through the dry tongue of moderate acidosis to the dyspnoea of severe acidosis, when the plasma bicarbonate is down to half.

The author refers to the introduction of intravenous injections of sodium chloride and sodium carbonate by Dr. Thomas Latta in 1831 for the treatment of cholera. Again, in 1910, the American Sellards showed the beneficial effect of intravenous sodium bicarbonate in cholera when uraemia and anuria were present. Rogers, using Sellard's treatment, reduced the mortality due to acidotic uraemia from 11.1 to 3.2%. The author's most earnest plea is for the use of isotonic sodium bicarbonate in the treatment of diabetic coma, and his evidence that its intravenous administration leads to a rapid return of consciousness is convincing. His account would, however, be more complete if he explained why Joslin gave up the oral administration of sodium bicarbonate in precomatose diabetic cases in the year 1917. Nevertheless, the argument that a combination of insulin and isotonic bicarbonate is more effective than insulin alone, and that it should always be given if the patient is moribund or if he reacts slowly to insulin alone, is strong. Most clinicians do in fact recognize the need of administering isotonic saline or glucose-saline to relieve the dehydration and to restore carbohydrate, but it is likely that sodium bicarbonate will relieve the symptoms more quickly than sodium chloride.

FROM CHILDHOOD TO MATURITY

The Psychology of Childhood to Maturity. By J. Guilfoyle Williams, B.Sc. (Pp. 324. 8s. 6d.) London: William Heinemann Medical Books. 1946.

The author has produced in reasonable compass an excellent book on normal psychology. He has not got the intimate knowledge of how things go wrong which belongs to the experienced psychiatrist, but he has read carefully and intelligently from the writings of these and so may be particularly well qualified to deal with the normal. His general approach is based on the analytic schools, but he does not slavishly adhere to any one of them and preserves a common-sense balance throughout his subject matter, which concerns psychological reactions from infancy to old age, dealing practically with child psychology, education, adolescence, sex difficulties, marriage, religion, disease, and death. He stresses the need for allowing the child to grow up in an atmosphere of wise guidance without any attempt being made to force him into a mould. He rightly remarks, "The most cruel treatment of a child is wanton and unjust forms of discouragement. . . . Ridicule should never be used with children and rarely with adults; it is a cruel and deeply wounding weapon." He shows his broad humanity in stressing that all sin is not sex: "Great and evil sinners are the men who destroy in others the faith they have in truth, justice, and goodness; the men who shatter some persons' irrational ideas and guides in life just to show their own powers or intelligence, but who do not replace these ideals or guides with better ones; the men who by cunning, trickery, or falsehood prey upon their fellow men by their activities in industry, commerce, the professions, or politics." The author presents an interesting theory which leaves open the possibility of survival after death, and may explain many of the well-established phenomena of clairvoyance, mysticism, and ultramaterial experiences. Altogether this is a book which will repay close study by every intelligent citizen.

PSYCHOLOGY FOR NURSES

Psychology Applied to Nursing. By Lawrence Augustus Averill, Ph.D., and Florence C. Kempf, B.S., A.M. Third edition. ($2.50 or 12s. 6d.) London and Philadelphia: W. B. Saunders Company. 1946.

The American nurse must be a person of much greater leisure or of much greater capacity for mental work than her British sister if she can regard a textbook of psychology of 484 pages without consternation. In it, moreover, she will find at the end of each of the twenty chapters what are called "thought problems for the student," which are long examination papers, each question calling for quite long essays and probably extensive reading not only of this book but of much of the "suggested reading" to be found after the "thought problems." That so extensive a task does not, however, appal the American nurse is indicated by the fact that a third edition of this textbook has now reached us. There is no doubt whatever that this is a thoroughly sound book for its purpose, if only there was not so much of it. The authors have covered the essentials of general educational and much of social psychology in simple language which the nurse or teacher should easily understand. Quite properly there is little about the complicated material of abnormal psychology or of the theories of psychopathology. There is an admirable insistence that the nurse should teach health to her patients and to do this it is held that: (1) The nurse should have related accurate information at her immediate command. (2) She should recognize and take advantage of "teachable" moments as they occur. (3) She should have the imagination and ability to use the right approach to each

patient. (4) She should be specific in her teaching and check her patient's interpretations. (5) She should recognize her patient's limitations, mental and physical, and teach carefully in the light of these. (6) The nurse should be generous with encouragement and commendation of the effort and progress shown by each patient. (7) She should know reliable sources of reference which are expressed in the language of the lay person. (8) The nurse should herself personify positive health. Would that all our nurses could carry out these requirements. Certainly the book should find a place on the shelves of all nurses' libraries.

Notes on Books

The Circulation in the Foetus (a synopsis for students), by K. J. FRANKLIN, D.M., F.R.C.P., A. E. BARCLAY, D.M., F.R.C.P., and M. M. L. PRICHARD, M.A., is published at Oxford by Blackwell Scientific Publications, Ltd. (Price 2s. 6d.) This is a digest of the authors' large work on the same subject published in 1944. A concise account of the course of the blood flow in the mature foetal sheep, as determined by cineradiography combined with intravascular injections of radio-opaque fluids, is followed by the description of the changes which occur after birth, the functional closures of the umbilical vessels, of the ductus venosus, of the foramen ovale and of the ductus arteriosus. Some very clear photographs and six explanatory diagrams increase the value of this excellent synopsis.

Elementary Bacteriology, by JOSEPH E. and ETHELYN O. GREAVES of the Utah State Agricultural College, of which we have received the fifth edition (W. B. Saunders Company; 20s.), is not a suitable textbook for medical students; the chapters on medical bacteriology, which occupy less than half the book, are inadequate for his needs. Those on bacterial metabolism, and on the industrial aspects of the subject, may be found useful to anyone unfamiliar with these branches. The style tends towards the sensationalism usually found only in popular works on microbiology, and the text is not free from errors, mainly in spelling. Koch, were he still alive, would be astonished to hear that his pupil, Walther Hesse, who first used agar in culture media, was an American.

In *Penicillin in General Practice* Dr. J. L. HAMILTON-PATERSON has written a useful guide to penicillin therapeutics in a handy form. He outlines its principles, describes methods both of preparation and administration, and deals then with the treatment of individual conditions. The instructions given, though brief and necessarily dogmatic, are adequate and orthodox. It is doubtful whether the more prolonged and technically difficult forms of treatment described should be undertaken outside a hospital, but their inclusion makes for completeness. It has been recognized (perhaps since this book was written) that certain bacteria here described as insensitive to penicillin are not wholly so, and some of the infections caused by them can be successfully treated. The advocacy of infrequent large doses for the treatment of syphilis should perhaps be more cautious until the effect on this disease has been studied further. The book is published by Staples Press, Ltd., at 5s.

Dr. EDWARD GRIFFITH'S book *Modern Marriage*, originally written in 1935, now appears in a 19th edition (Methuen and Co.; 7s. 6d.). The author has taken the opportunity of bringing his material up to date so that it may be even more useful than it has been in the past. Now that contraception is so generally accepted, and the term "birth control" is recognized as a misnomer, Dr. Griffith has omitted that term from the title of the book. He has added several new chapters and revised the old ones; in particular, the chapter on contraceptive methods has been entirely rewritten and simplified. The new material includes a chapter on mind and the emotions, and two on the subject of sterility.

The June, 1946, number in the series *Surgical Clinics of North America* (6 numbers yearly, 55s. annual subscription: W. B. Saunders Co., Ltd., Philadelphia and London) is dedicated to the Lahey Clinic, and a number of the staff discuss the clinic's work to advance colonic and rectal surgery. A masterly description of the two-stage abdomino-perineal resection of Lahey (1935) is essential reading for the many with whom it finds increasing favour in this country. The monograph—beautifully presented and illustrated—gives a comprehensive study of the techniques and results achieved by leaders in this field, and reflects credit on the surgeons and publishers of its country of origin.

The Film Committee of the Association of Scientific Workers has recently issued a pamphlet entitled *Notes on the Formation of Scientific Film Societies*. Copies can be obtained on application to the head office of the A.Sc.W. at 15, Half Moon Street, Piccadilly, W.1. The Film Committee was set up in 1938 to further the interests of the scientific documentary film, encourage the making of more such films, and sponsor the exhibition of scientific films.

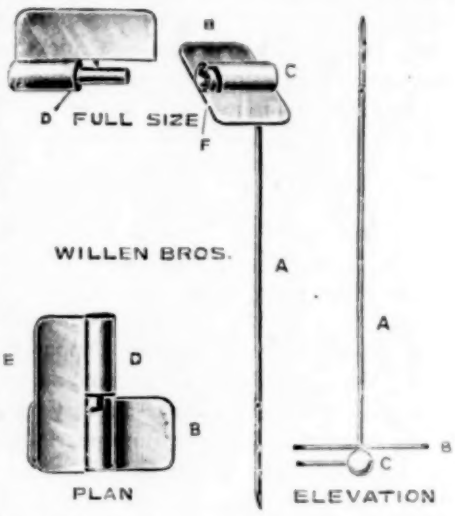
Preparations and Appliances

NEEDLE FOR INTRAMUSCULAR INJECTIONS AT REGULAR INTERVALS

Dr. I. BIERER writes from Bethnal Green L.C.C. Hospital:

Since the introduction of the 3-hourly penicillin injections we have been attempting to find a method for giving injections at stated intervals without the necessity for inserting a needle on each occasion. The reason for our desire to find such a method was that in our experience it has repeatedly happened that excitable or mentally deficient patients, or a patient weakened by a prolonged or serious illness, refused further injections. Many dreaded the experience of being wakened at night and, in expectation of the next injection, did not dare to fall asleep again. After a number of experiments we are now using the needle described below, of which an illustration is given.

A needle (a) is fixed to two wings (b) and to a female record mount (c) which lies between them. Into this mount fits a male record fitting (d) which is fixed to a third wing (e). A bayonet catch (f) fixes the male fitting firmly to the female mount. The needle is perforated at the distal end, thus ensuring a better distribution of the fluid. The whole instrument is made of stainless steel and the needle can be sharpened or replaced when desired by the firm who have made the instrument.



To insert, the needle is gripped by the three wings and inserted with a quick movement vertically into the muscle. As a result of this vertical insertion the wings can lie parallel, flush with the patient's skin, when they are easily held by two narrow strips of "elastoplast." When this has been done, in order to administer the penicillin or other drug you grip the male record fitting by the wing and withdraw it, make your injection, and replace the fitting, turning it by about 90° while doing so, so that it is caught by the bayonet catch and the wing lies parallel with the other two wings. Another small piece of elastoplast over the third wing might be necessary. According to the place of injection and the respective age and thickness of the muscles concerned, one of the following four needles can be used:

(1) 1 inch	21 S.W.G.	(3) 1½ inch ..	19 S.W.G.
(2) 1¼ „	20 „	(4) 2¼ „ ..	19 „

It is our general practice to leave the needle unchanged and in the same position for two days, but it has been left for up to seven days without any local reaction. After its removal it should be immediately syringed through with cold water. We have found this needle convenient to use, easy to sterilize, and quite painless for the patient, who is able to lie upon it without discomfort. A non-touch technique has been used by us in its insertion, and infection has always been avoided.

The use of such a needle appears to us to be very advantageous, especially in the case of nervous patients and those seriously ill. It should be of great benefit not only in hospital but particularly in general practice where doctors are unable to attend the patient every three hours. Once the needle is in position it is not difficult for a nurse or someone else to continue the injections according to the instructions given by the doctor. It should also prove of value in the treatment of cases of eclampsia and, apart from penicillin, in the administration of other drugs.

I am much indebted to the Medical Officer of Health, Sir Allen Daley, and to Mr. W. P. Greenwood, medical superintendent of the Bethnal Green Hospital, for the facilities put at my disposal and to the nursing staff for their help. My thanks are particularly due to Mr. Regan, of Willen Brothers & Co., 44, New Cavendish St., London, W.1, who have made the needle.

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THE CONTROL OF AIR-BORNE INFECTION

"The supply of safe clean air intra-murally," as it was described by R. Cruickshank at the meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine reported on page 831, is a good deal more difficult than corresponding reforms in the supply of water and other necessities which may act as vehicles of infection. It is indeed the greatest problem in hygiene still awaiting solution, at least in countries such as this. The encouraging trends in mortality statistics, as Cruickshank pointed out, give a false impression: morbidity figures, if we had them, would tell a different tale. Studies of the incidence of "A.R.D.," the abbreviation for acute respiratory disease which is now current in the U.S.A., have been more numerous in that country than in our own: we know that the average American has three colds a year. But common experience as well as the results of the few deliberate studies which have been made in Great Britain assure us that colds, influenza, sinusitis, and bronchitis bulk very large among diseases causing temporary incapacity for work; these together with pneumonia and specific infectious diseases involving the respiratory tract are all involved in any attempt to improve atmospheric hygiene. So much has been done and written on this subject in the past few years that an impression may have been given of great advances either already in progress or shortly to be expected. The general impression conveyed by speakers at this meeting was that a vast amount of essential information is still lacking and that any practical attempt at air disinfection must still be regarded as an experiment. Cruickshank defined two fundamental questions to which an answer is needed. First, what are the principal foci of infection: are they to be found in public transport vehicles, schools, offices, factories, or places of entertainment? There are two ways of finding an answer to this: the study of atmospheric flora by means of the slit sampler, possibly regarding *Str. viridans* as an indicator of pollution from the mouth and throat, just as *Bact. coli* is used as an indicator of faecal pollution in water; and, in the second place, study by inquiry in different community groups. The second question, equally vital in relation to any practical attempt at reform, is: How precisely are most of these infections conveyed—by droplets (direct), droplet nuclei, or dust? Two very suggestive observations in this connexion were mentioned. "Double bunking"—i.e., placing beds one above another in dormitories—has reduced the incidence of A.R.D. by 50%, which distinctly suggests that direct droplet spread is an important factor. The oiling of floors, under similar conditions, had no effect—an observation which seems to relegate dust to a position of little importance. As another speaker pointed out, it does not seem quite certain that all such infection is air-borne at all: infection by contact is a possibility which must not be forgotten. How many people suffering from a cold, their hands perhaps actually wet with secretion from a handkerchief will on that account refuse for their friends' and acquaintances' sake to shake hands with them?

The discussion of practical means of preventing the aerial spread of infection was focused on two problems in this connexion—that of the hospital ward where a specific infection exists, and that of the meeting-places of the community at large. These are two different questions and call for different measures. So far as the hospital ward is concerned the most fully investigated proceeding and the best supported by careful quantitative studies of its effects is the oiling of fabrics to prevent the formation and diffusion of infected dust particles. A representative of the British Launderers' Research Association told the meeting that the process of oiling has been improved and cheapened: it now need cost little more than 1d. per blanket, and the new emulsifier for the oil is something we have heard of before—cetyltrimethyl ammonium bromide. Such blankets are indistinguishable from those not so treated and have an equally long, if indeed not a longer, life. But opinion about the efficacy of oiling and the necessity for it, at least as a routine proceeding, was far from unanimous. Joyce Wright confessed that a repetition of her ward trials of 1943, made in another hospital in 1945, had failed to confirm the previous results. The total bacterial count in the air of the oiled ward fell as before, but the incidence of cross-infection with haemolytic streptococci in children with measles, which in the previous trial had fallen from 73 to 18.6%, was unaffected. The streptococci of the 1945 study were fewer and more miscellaneous and produced no cases of otorrhoea; but whether the difference lay in them or in some other factor was unknown. Various other opinions expressed on the usefulness of oiling gave the general impression that it should be resorted to for definite indications, but perhaps not adopted as a regular procedure.

The larger problem of disinfecting air in institutions and public places generally seems to have made little practical progress. The striking success of ultra-violet light in classrooms at the Swarthmore School, Philadelphia, in preventing the spread of measles does not seem to have been repeated elsewhere. The account by R. Hare, recently returned from America, of the sceptical atmosphere at a recent conference at Detroit at which this subject was discussed was not encouraging: it appears that neither ultra-violet light nor triethylene glycol vapour has proved its worth in large-scale practical trials. A positive contribution to this study, if scarcely beyond the stage of laboratory experiment, came from O. H. Lidwell, who cautiously both prefaced and terminated his remarks by pointing out that findings with bacteria are not necessarily applicable to viruses. Pursuing their studies of air disinfection, he and R. B. Bourdillon have shown that a quite remarkable bactericidal effect is exerted in air by lactic acid. Perhaps even better is α-hydroxy α-methyl butyric

acid: this has the advantage of being readily volatilized by heat, or even, from a large area, in the cold, whereas lactic acid has to be sprayed. These substances are rapidly bactericidal in air in very low concentration, but in order to act well on bacteria in dried particles they require a high humidity. They have been actually tested in the mass at the National Institute for Medical Research, where frequent slit sampler counts of atmospheric bacteria were made during the lunch hour. Both acids reduced the rise during this period of activity by about half, whereas the installation of ultra-violet lamps had a comparatively slight though appreciable effect. As Lidwell said, any such attempt to achieve practical air disinfection is still only an experiment. We can give no confident answer to inquirers who seek some means, apart from improved ventilation or lessened overcrowding, of improving the atmosphere of their premises in winter.

STARVATION IN GERMANY

The undoubted gravity of the food shortage in the British Zone of Germany has recently been underlined in comment in both Press and Parliament. From official and unofficial accounts there emerges the picture of a people suffering from under-nourishment, apathy, and moral exhaustion—the picture of a defeated nation now reaping the tares of Nazism. The state of health in the British Zone is something which must be the concern of the medical profession in this country, not only because of the humane basis of the work of the doctor but also because of the risk that a physically and morally depleted Germany may be the focus of epidemics which will spread beyond its frontiers. The voice of the propagandist is usually set in an emotional key, and in the discussions of the past few weeks it has been difficult to get a clear idea of what is happening, because there seems to be as great a shortage of facts as there is of food. As Prof. Major Greenwood points out in this week's correspondence columns: "We have no statistical information, not one death rate." We therefore publish elsewhere in this issue some figures obtained from official sources which, incomplete though they are, do at least help to bring the scene into some sort of focus.

The population of the British Zone was approximately 21,500,000 in February of this year, and it is estimated now to be about 22,750,000. The matter is complicated by the entry of illegal immigrants. The population of Hamburg is approximately 1,411,000, and on November 20 there were in Hamburg hospitals 1,197 persons diagnosed as suffering from hunger oedema; in the four weeks preceding November 20, 706 cases of hunger oedema were admitted. In a survey made on July 31, of 2,200 employees in a Hamburg gasworks 90 were found to suffer from hunger oedema. What is unknown is the incidence of hunger oedema among those not admitted to hospital, and in any assessment of its incidence we should bear in mind the observation by Dr. A. P. Meiklejohn and his colleagues in a letter to the *Times* that German doctors may naturally tend to exaggerate the incidence of hunger oedema among their compatriots in the British Zone. Weight is one index of nutrition, and in a survey of 1,200 factory workers at Mulheim in October it was found that 82.9% of the workers weighed less than 67 kg. (10 st. 8lb. approximately), which was taken as a standard body weight. But we should note here that the average weight of British Army recruits aged 20 during the war was about 61 kg. (9 st. 10 lb.). Tuberculosis is always regarded as a pointer to the state of nutrition in a community, and the available figures do not bear out alarmist reports of the incidence of this disease in the British Zone. Deaths from tuberculosis amounted to 1,275 in June, which was the worst month for the period June–September. This may be compared with an average four-week figure for England and Wales in 1937 of 2,135, it being borne in mind that the population in this country was then approximately twice the size of the present population in the British Zone. The morbidity rate of pulmonary tuberculosis in the British Zone for the first six months of 1946 was less than it was in the German Reich in 1941 and 1942, when the state of nutrition in Germany was supposed to have been high. From January to June of this year there was in the British Zone a progressive rise in the birth rate and a progressive fall in the infant mortality rate. In January, for example, the birth rate per thousand was 9.8 and the infant mortality 136; but corresponding figures for June were 18.2 and 72. We may recall that in 1942 the infant mortality rate for Glasgow was 91, for Dublin 98, and for Belfast 92.

It is, of course, not possible to make exact comparisons between the conditions in Germany now and conditions in England and Wales at other times; nevertheless the information that is available suggests that the picture is not so black as some have painted it. But though it is grey enough to cause apprehension there is a note of optimism in the most recent reports. According to the *Times* of November 25, the ration of 1,550 calories a day for the normal consumer in the British and American Zones of Germany will be continued during the next rationing period. It is stated that the "food position in the British Zone is regarded with more hope than at any time for the past three weeks." There is the loan of 50,000 tons of wheat and flour from the American Zone; grain and potatoes are coming in from the Russian Zone as a result of the trade agreement of September 20; and the harvest in the British Zone has this year been good, threshing now being 40% ahead of last year. But the margin is narrow enough, and no one in this country will be able to feel at ease until the Germans in the British Zone are getting enough to eat and until famine oedema has disappeared.

OTITIS AND THE MASTOID

The association of chronic otitis with a compact type of mastoid bone has long been recognized, and it was rather naturally supposed that the latter was the result of the chronic inflammatory process which caused a gradual obliteration of the air cells. Schwartze was a prominent exponent of this view and stated that eburnation or sclerosis of the mastoid bone was a frequent consequence of chronic

inflammation of the middle ear, especially when suppurative. It was, however, known that this sclerotic condition of the mastoid bone existed also with a normal state of the middle ear, and this had to be explained by an inflammatory process which had long passed away in the middle ear but continued to develop in the mastoid bone. Wittmaack later wrote much on this subject and concluded that the normal condition of the mastoid bone is cellular, the system of air cells developing rapidly at an early period of growth and producing a complete pneumatization in early childhood, though a fresh formation of cells continues throughout life. Under pathological conditions—that is, otitis in infants and in children up to two years of age—according to Wittmaack, the growth of the system of air cells is either inhibited altogether or much limited. There would thus occur both in children and in adults great variations on each side of the same person from complete absence of air cells to extensive pneumatization.

Although Wittmaack's hypothesis has received a general measure of qualified assent it has never carried conviction, and the view that the system of cells continues to develop in later life has not been fully accepted. Arthur Cheatle in particular, who devoted much of his life to studying the anatomy of the temporal bone, rejected the views of Wittmaack and held that the ivory, diploetic, and fully cellular formations are anatomical variations, of which the solid varieties predispose to chronic otitis. If this is so the problem of the association remains unsolved. Marcus Diamant[1] has made investigations of a clinical nature which support Cheatle but still do not fully answer the question which constantly presents itself in otology. The size of the system of air cells in the mastoid bone can be estimated fairly accurately in *x*-ray films in the lateral projection. A close study of this question by Diamant showed that the frontal projection had a close correspondence with the lateral, so that the volume of the cellular system could be estimated quite accurately by measurement of the lateral film with a planimeter. The clinical material was drawn from patients in a fever hospital and in private practice and included 320 normal persons, 123 cases of scarlatinal otitis, 144 cases of acute otitis media, and 275 cases of chronic otitis media, the last including both central and marginal perforations of the tympanic membrane with discharge. The original number of cases was larger, as only those subjected to re-examination could be included in the final assessment. The repeated examinations showed that in early childhood the cellular system of the mastoid is on the average small and grows rapidly, so that it is essentially fully developed in females by the age of 10 years and in males by the age of 15. It does not grow any further subsequently and appears to regress after the age of 30, contrary to the opinion of Wittmaack. In acute otitis it was found that the average size of the cellular system is only three-quarters of the size of the normal and is about three times as large as that in chronic otitis. The ear with the smaller cellular system is the one more commonly attacked (69%, as against the 50% that might be expected). In chronic otitis almost all the ears have cell systems much below the normal, the average being about a quarter of the normal size. In marginal perforations the size is less than in central perforations. If the tympanic membrane shows scar formation the cellular system is less than normal, but the system is larger than in cases which show a persistent perforation. There is thus a close correlation between the size of the cellular system and chronic otitis, and to lesser extent acute otitis. On the other hand many persons with small cellular systems never contract otitis.

This elaborate work by Marcus Diamant, which has been closely checked statistically, is therefore a striking clinical confirmation of the views expressed many years ago by Arthur Cheatle, but it gives no explanation of the phenomenon.

[1] *Otitis and Pneumatisation of the Mastoid Bone. A Clinical-Statistical Analysis.* By Marcus Diamant. Lund: Håkan Ohlssons Boktryckeri. 1940.

PRE-OPERATIVE DIETS

Within recent years surgeons have become increasingly aware that the nutritional state of their patients plays an important part in their ability to withstand severe operative procedures. Since it is the protein-rich tissues or body fluids which are damaged or lost, attention has naturally been focused on the protein component of the diet. Cuthbertson was probably the first to point out the magnitude of the catabolic destruction of body protein which follows injury, and he has recently reviewed the principles involved and the problems of convalescence.[1] Pre-operative dietary problems have been dealt with in considerable detail by Varco.[2] The pre-operative ingestion of protein in adequate amount is as, or more, effective than corresponding increments made available in the post-traumatic phase. Cuthbertson and Howard and their associates[3] have shown in fracture cases that despite abundant food and substantial increases in the intake of protein a negative nitrogen balance exists at the height of the catabolic period, which reaches its maximum usually within the first ten days following injury or operation. Peters[4] has reported a similar situation in acute infections. A condition of nutritional imbalance may also be present in a patient for a considerable time before operation. The operative procedure may then accentuate the degree of negative balance, as the amino-acids required for the process of repair may necessitate a further breakdown of reserve protein. According to Munro[5 6] this latter response is conditioned by the nutritive state, and liver dysfunction may develop, particularly when the diet has been scanty.

A satisfactory nutritional preparation will extend the benefits of surgery to the type of patient who in the past has often been regarded as too poor a risk. The pre-operative steps should include not only restoration of the water and electrolyte equilibrium but so far as possible a high-protein, high-carbohydrate diet. Skim-milk powder has been shown to have many advantages as a source of protein in pre-operative diets. Diet 1 described by Varco consisted of 160 g. protein, 407 g. carbohydrate, and 18 g. fat (calorie value 2,426 with 1.6 calories per ml. of fluid diet). Diet 2 consisted of 120 g. protein, 409 g. carbohydrate, and 37 g. fat (2,446 calories and 1.6 calories per ml.). This was a less tasty diet, rendered suitable for feeding by a nasal tube. The basis of Diet 1 was strained oatmeal, skimmed milk, lactose, orange purée, pea purée, egg, and grape juice; that of Diet 2 egg, skimmed milk, skimmilk powder, and lactose. These diets were frequently given in the order Diet 1 by day and Diet 2 by night. Diet 1 is

1 *Brit. med. Bull.*, 1945, **3**, 96.
2 *Surgery*, 1946, **19**, 303.
3 *Johns Hopk. Hosp. Bull.*, 1944, **75**, 156, 209.
4 *Fed. Proc.*, 1944, **3**, 197.
5 *Biochem. J. (Proc.)*, 1943, **37**, xii.
6 *Brit. J. exp. Path.*, 1945, **26**, 396.

said to be palatable and is given in multiple servings. Diet 2 is designed for tubal feeding and although less palatable is taken readily by mouth. Varco has given 5,000 to 6,000 calories to patients with ulcerative or neoplastic lesions of stomach and duodenum but little or no pyloric obstruction. Patients with partial obstruction were given limited quantities of Diet 1 by day and Diet 2 by night. From midnight to 8 a.m. during the initial days no feeding was allowed; the stomach was then evacuated by nasal tube and the quantity measured. Patients having aspirations of less than 500 ml. were continued on this regime, which should permit or even exceed 3,500 calories daily. For patients with high-grade but not complete obstruction a continuous stomach drip was set up and Diet 2 given. In cases with complete pyloric obstruction the bulk of the daily calorie intake was provided by hypertonic glucose (20% in distilled water) dripped intravenously at the rate of 100 to 125 ml. per hour through a fine needle, so that 1,500 ml. (1,200 calories) would be infused in ten to twelve hours. Hourly rates in excess of this caused glycosuria. The calorie requirement was further met by 1,000 ml. of 5–10% glucose in distilled water or saline solution, as determined by electrolyte need. Protein was supplied daily as plasma. Experience has shown that it is more comfortable if a forearm vein is used. This allows a freer range of movement than does insertion into an antecubital vein.

Protein digests do not as yet appear to offer a satisfactory solution to this problem owing to the large volumes required. Further, in the non-obstructive cases there is presumably adequate enzymic activity without recourse to predigestion. Diets 1 and 2 of Varco can be applied to the treatment of cases with neoplasms of the colon, sigmoid and rectum, and to burned patients. Varco has suggested that when the percentage loss in body weight is 5–10% three to five days of proper treatment are sufficient. When the loss approaches 20% ten to twelve days are necessary, and three weeks are needed when the loss approximates 25–30%.

This recent work is very suggestive, although it does not yet provide proof that such measures of nutritional readjustment can yield a margin of safety for these poor-risk patients. The clinical evidence in support of Varco's thesis is certainly worthy of consideration and confirmatory trial.

A NEW ANTIBACTERIAL COMPOUND

Recently the discovery has been announced[1] of a new synthetic compound called furacin (5-nitro 2-furaldehyde semicarbazone) $O_2N-C_4H_2O-CH=N-NHCONH_2$ which is actively bacteriostatic or bactericidal, and is said to be effective clinically by local application to infected wounds. It is a yellow solid only slightly soluble in water and is not unduly toxic. In a concentration of 1 : 20,000 to 1 : 200,000 it inhibits the growth of many varieties of Gram-positive and Gram-negative organisms *in vitro*. This is not a very high degree of activity, however, and it does not act *in vitro* on *Ps. pyocanea* or on *Str. viridans*, but does have a fairly strong action on *M. tuberculosis*.

When a single oral dose is given to mice the LD50 is about 590 mg./kg., and the chief toxic symptom is hyperirritability, which may go on to convulsions. Mice were infected with 10,000 lethal doses of various bacteria, and the effect of treatment by daily oral doses of the compound was studied. In the optimum dose (150 mg./kg. daily for 3 days) furacin was fairly active against *Staph. aureus*, *Str. haemolyticus*, and two Salmonella organisms, but it was ineffective against *Str. pneumoniae*. It is fairly active against *Trypanosoma equiperdum* in mice and *Treponema pallidum* in rabbits, but it has no action on *Spirochaeta recurrentis duttoni* in mice. Even the optimum dose protects only 67–70% of the mice treated for the above infections, and the explanation of this phenomenon is obscure. Larger doses increase the death rate, although 150 mg./kg. daily is considerably below the ordinary lethal dose.

The production of every new antibacterial compound is to be welcomed, and the results of clinical trials, which will soon begin, are awaited with interest. If furacin had been described 13 years ago it would have been greeted as a great discovery, but the figures suggest only a relatively low activity *in vitro* and *in vivo*. In an era of sulphonamides and penicillin a new antibiotic requires very high therapeutic efficiency or some other advantage for it to become established in clinical practice.

[1] Dodd, M. C., *J. Pharmacol.*, 1946, **88**, 311.

WOMEN IN INDUSTRY

The report of the Royal Commission on equal pay, which was published on Nov. 6, brings into prominence the opinion that female labour is less productive than male, a view widely held by employers but dissented from by three of the four women members of the Commission. This supposed inferiority of female labour is difficult if not impossible to assess accurately; it is usually attributed in part to a greater liability to ill-health in women. The B.M.A., whose policy has always been equal pay for equal work, gave evidence before the Commission stating that the contention was not valid for medical women.

The importance of investigating the health of women in industry is emphasized by a statement made by Dr. Anna Baetjer[1] to the effect that in the U.S.A. no fewer than 16 million women are expected to be gainfully employed by 1950. Their employment presents many health and personnel problems which differ from those encountered in the employment of men, partly because of the physiological differences between men and women and partly because of differences in their social backgrounds. If women are to be utilized by industry with the maximum of health and efficiency these problems must be much more fully understood than at present. To this end, Dr. Baetjer has collected a considerable mass of such information as is available, and has presented it in a very readable form with numerous references to published work. She has by no means confined her sources to American literature, but has done full justice to the investigations made in this country. She lays stress on the considerable gaps in our knowledge which her data indicate, and the monograph should prove most useful and suggestive to future investigators.

In her long section on sickness-absenteeism, Dr. Baetjer discusses the various reasons given to account for the greater sickness of women than of men. It may be due partly to women taking their aches and pains more seriously than men do, to their having more home responsibilities and duties, and to their greater indifference to adequate nutrition, but perhaps the most important factor of all relates to the proper placement of women in relation to their physical and mental capacities, and to the attitude of their supervisors. The extent of occupational diseases among women is not known, but there is some reason to believe that toxic dusts, gases, and fumes do not affect their health more than that of men. Information regarding the number of women exposed to harmful chemical substances and the extent of their exposure is very limited,

[1] *Women in Industry. Their Health and Efficiency.* By Anna M. Baetjer, Sc.D. W. B. Saunders Company. 20s.

but so far as we know it is probable that occupational dermatoses are neither more nor less common among women than men, and there is no reason why normal women should be restricted any more than men from working at jobs which involve the use of toxic substances, with one exception. This relates to pregnant women, who appear to be more adversely affected than normal women. Substances such as lead have been shown to exert a specific influence leading to abortion. Also pregnancy places a limit on the ability of women to do physical work, but there is no reason why the women should not be allowed to continue on certain types of work, especially if provision is made for changes of posture during the work period. Continual sitting is no more desirable than continual standing.

An appendix to Dr. Baetjer's book records several thousand occupations known to be performed regularly by women or apparently suitable for them, with information about the normal training period required.

"ELECTRONIC BRAIN"

A good deal of very natural misunderstanding appears to have been caused by Lord Mountbatten's reference to the possibility of an "electronic brain." There are indeed few limits to the feats of discrimination and subsequent action which radio circuits can now be made to perform. But thought, in the strict sense of the word, cannot be included among their capabilities.

The distinction is illustrated by a device of another kind which is stated to be already in use by one electrical firm for the transmission of dial readings down a telephone line. To changes of less than a certain amount this machine will "pay no attention" unless they are sustained for more than a prescribed interval of time. Greater changes, on the other hand, which may be of immediate importance, will be transmitted at once and without giving time for the needle to settle down. This is judgment, if you like; but it is judgment exercised in accordance with a set of rules which have been laid down in advance by designer or operator, and which the machine itself does no more than obey. Alternatively, one may say that the machine is displaying a reflex action, the form of which has been externally determined—or shall we say conditioned?

The manner in which such instructions are given to the machine is of considerable practical importance. In the original Eniac machine, which was built for the U.S. War Department at the University of Pennsylvania, the instructions as to the arithmetical procedures to be followed are given by making a series of plug and socket, and switch, connexions by hand. In the A.C.E. (Automatic Computing Engine) which is being built by the Mathematics Division of the National Physical Laboratory punched cards will be used to give the machine all the preliminary guidance it requires. Standard sets of cards, covering different types of calculation, will be stored in a special library; and the instructions for any particular problem will be assembled from these prefabricated units, linked together possibly by any further special instructions which may be needed. Only about two minutes of the machine's time will be occupied. The second requirement, naturally, is that of speed. The A.C.E. is being designed to multiply two ten-figure numbers in two thousandths of a second. This is about half as fast again as Eniac; but when speed of working is in any case so high any improvement in this direction will be of comparatively minor importance. Thirdly, such a machine is required to "remember," and to reproduce at a given moment, any intermediate stages of the calculation which may be required of it. This is of obvious value in very many types of computation, and it is here that A.C.E. will have its second big advantage. The "internal memory" capacity of the A.C.E. will be 75,000 decimal digits, as compared with only 200 in the Eniac machine.

As one illustration of the heavy work which A.C.E. will be able to undertake, it may be mentioned that, whereas most mathematicians would abandon as too laborious the solving of a set of simultaneous equations with even twelve unknowns, the A.C.E. will be capable of tackling fifty or even a hundred unknowns, with merely a few extra seconds in which to do the work. On account of the high speed at which it will operate, and the short time required to give it "instructions," it is thought that this one machine will be able to handle the whole of the problems which this country's research workers and mathematicians may wish to give it.

A RADIOLOGICAL PIONEER

Older radiologists will recall the attractive personality of Major C. E. S. Phillips, who died last year after serving the Royal Institution for sixteen years as secretary. The addresses given at a commemoration meeting at the Royal Institution have just been published. They were given by those who were associated with Phillips in his various activities, which included music and sketching as well as physics, and they reveal a man (in the words of Sir Henry Dale) "whom a fortunate inheritance had placed beyond the need for working for a livelihood, but who gave eagerly of his time and substance in the field of science, art, and scholarship"—the type of the true amateur which under the rapidly changing conditions of the modern world must, one fears, become rarer. Phillips was a pioneer in the application of *x* rays to the living body. He began work on *x* rays in his father's laboratory early in 1896, a few months after the announcement of Röntgen's discovery, and an *x*-ray photograph of his belonging to that period is in existence—a skiagram of the hand, taken with a Lenard tube with 35 minutes' exposure. Later he did some notable work in formulating a quantitative basis for the therapeutic use of the radiations. Dr. W. V. Mayneord recalled how Phillips during the first world war acted as physicist to the *X*-ray Committee of the War Office. At about the same time he became honorary physicist to the Cancer Hospital in the Fulham Road. He was thus one of the earliest of hospital physicists. In those days collaboration between clinicians and physicists was unusual, and those who have since taken up the calling of hospital physicist are fortunate to have had as almost the first of their number a man with the knowledge, insight, and charm of Phillips. One of his strong beliefs was in the unity of purpose between the doctor and the scientist in the advancement of medical radiology. In 1909–10 he was president of the Röntgen Society, and in 1930–1 he was president of its successor—the British Institute of Radiology. The latter body possesses among its treasures a set of three small radium standards which Phillips prepared in 1909. They were made in the form of three glass tubes containing in all about 0.5 mg. of radium bromide. These three standards were compared with a weighed amount of radium bromide in Rutherford's laboratory and presented by Phillips to the old Röntgen Society.

The Croonian Lectures will be given before the Royal College of Physicians of London by Dr. H. L. Marriott on Dec. 3 and 5 at 5 p.m. Subject: "Some Quantitative Considerations Regarding Depletion of Tissue Fluid and Blood Constituents."

SOME AMERICAN IDEAS ON VENEREAL DISEASE CONTROL

BY

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The main pillars of any venereal disease control programme are: (1) the seeking and controlling of nests of infection; (2) prophylaxis; (3) getting patients and their contacts under observation and treatment; and (4) ensuring that those patients remain under treatment until they are at any rate non-infectious to others. If 100% success could be obtained on all of these four points, then venereal disease as a public menace would be conquered. In order that all concerned may co-operate to this end, the aims and the methods of arriving at them must be made public, and hence education and propaganda to a greater or lesser degree are also essential.

Let us consider briefly how far we have progressed along the road in this country. So far as seeking out nests of infection is concerned prostitution is theoretically illegal, but anyone who walks in the West End of London can see that it is far from suppressed. Furthermore, girls known to be in the "profession" are not subject by law to medical examination. Candidates for marriage are not compelled to have a premarital blood test, though most hospital clinics do one as a routine measure in the case of pregnant women. To ensure that potentially infected people receive treatment we rely on voluntary methods of persuasion, and our attempts at legislation on this are confined to Regulation 33B, which is a step in the right direction, though from the aspect of V.D. control it is but a short distance along the path. To ensure that patients remain under treatment, arrangements via almoners and other V.D. clinic workers are as good as can be devised; on the other hand, for the tracing of infected contacts we have to rely on the public spirit and social conscience of the infected patient and the perseverance of the clinic doctor.

When viewed dispassionately, we obviously have not got very far, and, as things stand at present, probably can get little farther. Unfortunately the traditional British ideas of liberty and freedom also have to include the freedom to have venereal disease and to transmit it to others. This has obstructed any attempts to obtain broader legislation. As a result the efforts of education and propaganda suffer from the same inherited traditions, and tend to be colourless and inhibited as compared with places where legislation has been enforced. From the point of view of effect, one would have thought that countries possessing the legislation would actually require less propaganda to attain the ends required than those where voluntary effort has to be relied on. In any case, the U.S.A., which has the advantages of much legislation, finds it needs quite a considerable amount of propaganda to reinforce it, and by comparison our efforts here are puny.

Legislation

The laws enforced in the U.S.A. differ from State to State. In New York, however, the Sanitary Code, the Domestic Relations Laws, and the Public Health Laws require that a licence for marriage be refused unless the application is accompanied by a certificate stating that an examination and a blood test have been done by a competent physician within the last month. The patient also has to sign a declaration that to the best of his belief he is free from venereal disease. In addition, all physicians attending pregnant women are by law required to do a blood test for syphilis; while under Article 17b of the State Public Health Law the Department of Health is empowered to compel all individuals suffering from communicable venereal disease to seek proper and sufficient treatment, and doctors are instructed to issue circulars of information to all patients with syphilis or gonorrhoea. What is more, these diseases are compulsorily notifiable to the City Health Department. Finally, all women arrested on a charge of prostitution have a compulsory medical examination, and treatment if infected. Other cities, such as Chicago, have similar laws, and most if not all of them have a Venereal Disease Control Section at the City Health Department. In these places a central registry is kept and contacts are traced and followed by letter, registered letter, telegram, or social visit, according to local custom and expediency, and persistent defaulters are thus found when the almoners working locally at the clinics have otherwise failed.

The following is a description of the practical application of the four major items of V.D. control in New York and Chicago.

Seeking and Controlling Sources of Infection

In my visits to Washington, Baltimore, Philadelphia, New York, and Chicago, and often walking alone on the streets at night, I was never once accosted by a woman, and prostitution as such is definitely concealed. It can, however, well be argued that it is not banished, for 5,000 women are arrested on a charge of prostitution in New York State each year, but those arrested are compulsorily examined. In Chicago bar-keepers are invited to participate actively in V.D. control, and in August, 1945, over 4,000 tavern owners attended a meeting convened by the Medical Officer of Health, Dr. Bundeson. Certificates stating that hotels and bars are co-operating are issued and displayed. This co-operation really consists in ensuring that the saloon is not used as a place of assignment, and also that information is given to social workers as to the location of any of the bar habitués if they have been notified as contacts or potential sources of infection. If a particular bar is found to be a frequent place where patients meet the source of their infection, then the hotelier is visited by a representative of the Health Department and asked to mend his ways. If he refuses he runs the risk of having his premises shut and notices like "SYPHILIS—BEWARE!" and "VENEREAL DISEASE—KEEP OUT" plastered outside the building. Co-operation is usually forthcoming.

Prophylaxis

Methods of prophylaxis have never been so actively imposed upon civilians as on military personnel. In Chicago, Service men on furlough are given a printed list of eighteen "pro" stations that have been set up in the city for their use.

Getting Patients under Treatment

This consists in bringing in all those who are reasonably expected to be infected and the tracing of contacts. Compulsory notification is an essential to this end. In Chicago this was conducted by the epidemiological section of the Chicago V.D. control programme. The very name gives the clue to the approach to the problem, and venereal disease is being tackled realistically from the epidemiological standpoint.

All patients are interviewed at the outset and, in addition to being educated concerning their condition, are persuaded to identify all possible contacts. About 2½ contacts, on an average, are found for each case of early syphilis. Rosenthal in New York quoted 36 remembered telephone numbers out of 49 exposures from one of these "victory girls" or "patriotutes." Some 4,000 reports of contacts or diagnosed cases of V.D. are dealt with in Chicago each month, so a priority list consisting of contacts of early syphilis and recent gonorrhoea is necessary. Registered letters are used in the first instance to induce notified contacts to report to the Health Department. If these fail, then a field worker is put on the job. The field workers each have their own territory and there is a special "tavern squad." In six months (January to June, 1945) some 11,500 epidemiological reports reached the epidemiological section in Chicago. Of the patients concerned 2,614, or 22.8%, were placed under treatment, while 11.5% were already receiving it; 12.8% were examined and found not infected. Just over 30% went unlocated.

All this work cannot be done without a considerable staff. The epidemiological section has its quota of the 602 workers employed on the Chicago V.D. project. The file cards are made out in quadruplicate, the carbons being attached in advance at the printers. The phonetic system of name filing is employed, the Smiths, Smythes, and Psmiths all being grouped together. Recently they have had the advantage of electric typewriters, of which the stenographers spoke very highly. The whole project here is under the V.D. Control Officer (Dr. Theodore Bauer), who in his turn is under the Medical Officer of Health, who takes a very active part in putting over the programme.

Ensuring that Patients Remain under Treatment

In the year ending June 30, 1945, some 1,094 cases of primary and secondary syphilis had been diagnosed in the Health Department V.D. clinics in Chicago. All but 23 (97.9%) received intensive treatment in the 200-bedded Chicago Intensive Treatment Centre, a hospital used solely for this purpose. This centre has been a forerunner of rapid syphilis therapy with intensive arsenic, with fever, and latterly with penicillin, by themselves or in combination. The average stay in hospital is ten days and all treatment is free. Attractive meals are served cafeteria style, and no visitors or incoming telephone calls are permitted. The wards, however, carry public telephone booths for outgoing calls, so that the patient is isolated only so far as he or she wishes to be. This innovation is a real boon for patients and could with advantage be copied in Britain, as, apart from the benefit to patients, it is time-saving for the nursing staff, who otherwise often undertake such small jobs. The hospital was opened in 1942, and early in the New Year of 1945 it treated its ten-thousandth patient.

While they are in hospital patients are supplied with magazines, games, and puzzles. Recreation hours are organized in the hall, equipped with a piano, a juke box, library, and canteen. Handicraft classes are offered as diversional therapy, and films are shown four nights weekly—two for men and two for women. It cannot be denied that in Chicago the vast majority of syphilis cases diagnosed are getting full and adequate treatment.

The gonorrhoea cases attend the clinics as out-patients. The Chicago Municipal V.D. Clinic takes the bulk of these, and may well be the most-used V.D. clinic in the world, some 1,300 passing through its doors each day. Over twenty persons of both sexes can be dealt with simultaneously. This clinic is in a converted school, and the actual buildings are not anything marvellous. Its clientele are black and white of all grades of society. The main waiting-room is like a station on a bank holiday, while in the treatment room a small corps of doctors are dealing with patients as fast as they can go in the twelve centrally operated cubicles. In 1944 some 23,500 cases of venereal disease were treated in this clinic alone. In its first year of operation—1918—only 870 were treated. All cases of syphilis are referred for treatment at the Intensive Treatment Centre, as also are patients with penile sore and lymphogranuloma inguinale, for diagnosis. The gonorrhoea cases are treated on the spot, using the one injection technique of penicillin in oil–beeswax. As with syphilis, all diagnosed cases of gonorrhoea are receiving their full treatment.

For the tracing of cases for follow-up, social workers are used by the individual clinics. From the epidemiological standpoint the majority of patients with syphilis or gonorrhoea have actually already received the full amount of treatment necessary to cure them before leaving the hospital or clinic. However, a careful follow-up, especially of the syphilis patients, is necessary so that reliable data on the success of the various treatment schedules used may be obtained. As a result of letters, telephone calls, telegrams, and field visits, some 70% of the first 3,000 early syphilis cases treated in the intensive treatment centre at Chicago are still under observation.

From the foregoing it is obvious that everything possible is being done to ensure that infected persons are brought under observation, and a very high standard of success is obtained in seeing that cases, once found, do receive the necessary treatment, thus rendering them non-infectious.

Propaganda

Propaganda regarding venereal diseases is used to reinforce the main points already mentioned. However, before any propaganda can be used the actual diseases have to be "mentionable." The same influence is noticeable in this country, and the initials V.D. usually feature largely on any propaganda placards. I do not think we have yet succeeded in making V.D. a topic that can be discussed freely everywhere without embarrassment. Certainly the mild efforts on the radio, while admitted at the time, have not reached the level of a weekly feature. America has not yet completely succeeded either, but the words are being forced into the vocabularies of the inhabitants whether they like it or not. They have argued that "T.B." and "B.O.," as terms, are socially acceptable, and as the latter has so become solely by frequent advertising, then, by the same process, V.D. can too. Hence at present much propaganda still has to be wasted in bringing the real subject on the agenda for discussion, and the motives, such as advertising treatment centres, urging blood tests, or discouraging promiscuity, are bound up with the general advertising of the subject. Furthermore, there is no shortage of paper in the U.S.A.

In Chicago the trams and buses are an obvious medium for the display of propaganda posters. The first one used was, "Do you know, THOUSANDS have V.D. and don't know it? Are YOU one of them?" At the foot, in smaller print, was the address of the Chicago Health Department: "Ring Ran 8000 Ext. V.D." This has now been changed to "Don't be an Ostrich—Face the Facts—V.D."—a slogan which was also found on leaflets in New York. Window cards for barbers' shops, hotel-keepers, and "co-operators" are also available, and doubtless were used during the first flood of enthusiasm, though I do not remember seeing them being used anywhere during my visit. Matches, too, are employed. The Harlem Social Hygiene Council distribute in New York book matches coloured black with "V.D." in large red letters on the cover (the initial selling motif again). In Chicago, where perhaps they consider that the initials are now accepted, a more modest book match is used with a yellow cover bearing the words "FIND OUT . . .," and an arrow pointing inside to a list of the addresses of the municipal clinics. Matches are given away free by tobacconists in the United States, and in Chicago much was done to induce drug stores and other establishments to buy propaganda varieties. Over a million have already been issued, and a further million are on order.

A strong Chicago placard contained a black-and-white picture of a lady of the streets and was inscribed, "Easy to pick up—V.D." Another leaflet available in a New York health centre, showing a very photogenic six-months-old baby, was inscribed, "Our children need never know the sorrow of SYPHILIS." A further leaflet in the same centre, headed, "What you don't know CAN hurt you," contained the following story:

> "Arguing Al was scared of syphilis. Al would face any man in an argument or fight, but he could not face going to his doctor and finding out what ailed him. You know how some people feel . . . 'What I don't know won't hurt me.' That was Al. When the sore that was worrying him went away he said: 'Aw, that wasn't syphilis,' and he put the whole thing out of his mind. . . . Fifteen years later syphilis put him in a wheel-chair for the rest of his life. From then on his wife and kids had to shift for themselves, and for him, too. The pay-off was this: Al had lost out to syphilis. The doctor could have cured him, if Al had seen him when the sore first came. . . ."

This more direct approach obviates any repetition of the story of the lady Chicagoan who thought V.D. meant vitamin deficiency.

Over 600 workers are employed to carry out Chicago's programme, and everything is done to make them understand the whole picture. Originally issued bi-monthly, but now published quarterly, is a small periodical entitled *V.D. Topics*, written solely round the work. It carries, too, a "scandal-sheet enclosure" with information about weddings and other social activities of the workers and even the doctors themselves. On at least one occasion the entire staff has been allowed time off to attend a short course given by other members on their own particular aspects. This even included the staging of a series of skits showing, among other things, imaginary conversations with difficult wives, and the tavern squad at work.

A new type of advertising has been tried recently with a movie juke box which alternates entertainment reels with V.D.-control messages. The complete show lasts ten minutes, and can be operated free by pressing a button. It was first used in the large municipal clinic to educate and relieve the tedium of waiting out-patients, and, in order not to interrupt the show, a blackboard was improvised to call the patients when treatment was due. Latterly it has been fulfilling a number of two-weeks engagements in the various billiards saloons in the city. The Medical Officer of Health gives luncheon addresses, which are carried by newspapers, and the radio is used for talks. On a broader basis, the American Social Hygiene Council as part of its widespread activity holds conventions on Feb. 7, which is National Social Hygiene Day.

To the British mind the first reaction to some of these ideas is one of surprise mingled with amusement. On consideration, however, it is readily perceived that it is all the logical pursuance of an accepted line of thought. Venereal disease must be reduced and stamped out. To do this, legislation is introduced, and to make it watertight the fullest publicity is given. It is both logical and realistic; but its results are disappointing. The number of gonorrhoea patients in Chicago V.D. clinics climbed from 892 in August, 1944, to 1,685 in August, 1945. This was partly attributed to the popularity of penicillin. However, the numbers of new cases of venereal disease are still rising. In New York, too, they are on the increase. It is said, though, that the rate of increase is less when compared with that during and after the war of 1914–18, and also that much of the increase is apparent owing to the greater and ever-increasing efficiency in tracing contacts and getting infected persons under treatment. When the peak is reached it will be interesting to see to what level the final figures attain as a result of the realistic programmes that are afoot. Meanwhile we must never lose sight of the trenchant observation of Stokes, as quoted by Rosenthal:

"Venereal disease dissemination take place in the period between infection and the institution of treatment control. It is not the patient under treatment who spreads disease, but the promiscuous individual before and after treatment. In other words, we must move against promiscuity rather than, or in addition to, disease."

[Note.—The views expressed in this paper are my own personal opinions and not necessarily those of any official body with which I may be associated.]

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LEAGUE OF RED CROSS SOCIETIES

At the 19th meeting of the board of governors of the League of Red Cross Societies, held at Oxford, recommendations of the advisory health committee of the League were presented by its chairman, Dr. Fred Routley. The part which the national Red Cross Societies might play in rehabilitation and also in the blood transfusion service was discussed. It was agreed that the rehabilitation and resettlement of the disabled is a form of humanitarian service in which Red Cross Societies in every country ought to take part in every way possible. It was recognized that rehabilitation is a continuous process, beginning in hospital and extending throughout convalescence, that it is an individual process, requiring adaptation to the need of each patient, and that it is a vocational process, related to the patient's future means of employment. It was agreed that members of Red Cross Societies should be prepared to take an active part in the work of rehabilitation by assisting the trained staff in hospitals and rehabilitation centres and by helping disabled persons in their own homes. Special reference was made to the rehabilitation of the tuberculous.

On the question of blood transfusion it was considered desirable that a Red Cross Society should not pay for any blood supplied to it by a donor, but that it should, by continuous publicity, point out to all citizens the great value of transfusion and their obligation in safeguarding the lives of others by ensuring an adequate supply of blood. Other recommendations were that in countries in which an adequate blood transfusion service does not exist Red Cross Societies should investigate the possibilities of establishing such a service under their own direction, and that there should be uniformity in the colours of the cards used to denote blood donor groups so as to facilitate international working; thus green might be chosen for universal donors (O), red for the AB group, and yellow and white for the A and B groups respectively. It was also recommended that in view of the part played by some Red Cross Societies in the control of epidemic and endemic disease an international meeting of experts in infectious diseases should be convened.

BRITISH ZONE IN GERMANY

NUTRITION AND DISEASE

While public comment on the health of Germans has been voluminous in the last few weeks, a dearth of published vital statistics has rendered much of it a matter of speculation. We therefore reproduce below three Tables (I–III) from the journal sponsored by the British Control Commission, the *British Zone Review* (Oct. 12, 1946, **1**, 28). The figures are those officially accepted by the Public Health Department of the Control Commission.

TABLE I.—*Vital Statistics for German Reich*

Year	Birth Rate per 1,000 per annum	Death Rate per 1,000 per annum	Infant Mortality per 1,000 Live Births per annum
1938	19·6	11·6	60
1939	20·4	12·3	61
1940	20	12·7	Not available
1941	18·6	12·0	" "
1942	14·9	12·1	" "
1943	16	12·2	" "
1944	Complete figures not available		
1945			

TABLE II.—*Vital Statistics for British Zone*

1946	Birth Rate per 1,000 per annum	Death Rate per 1,000 per annum	Infant Mortality per 1,000 Live Births per annum
Jan.	9·8	15·4	136
Feb.	11·7	14·3	109
March	13·7	16·1	109
April	16·1	15·1	89
May	17·9	14·1	82
June	18·2	10·9	72

TABLE III.—*Morbidity from Infectious Diseases: Incidence per 1,000 Population per Annum*

	German Reich				British Zone	
	1938	1939	1941	1942	Last 6 Months 1945	First 6 Months 1946
Diphtheria	2·2	2·2	2·28	3·12	2·7	2·19
Scarlet fever	1·68	1·93	3·1	4·46	0·49	0·3
Pulmonary T.B.	0·89	0·91	1·31	1·41	0·73	1·01
Other T.B.	—	0·082	0·17	0·19	0·9	0·16
Cerebrospinal fever	0·027	0·078	0·053	0·031	0·01	0·01
Poliomyelitis	0·085	0·053	0·059	0·044	0·02	0·002
Typhoid	0·043	0·05	0·086	0·18	0·78	0·42
Paratyphoid	0·047	0·045	0·054	0·068	0·17	0·08
Dysentery	0·078	0·079	0·11	0·17	0·25	0·07

The difficulties in arriving at accurate figures are acknowledged by the Control Commission, not the least of them being the assessment of the population at risk. At the end of February of this year the population of the British Zone was approximately 21,500,000; on Aug. 31 it was 22,691,463; and at present it is about 22,750,000. About 5,000 illegal immigrants are entering the British Zone every week from the east, most of them in "very bad condition." In addition a small number of refugees are legally admitted.

It will be seen from Table II that the infant mortality rate is higher than it should be. Nevertheless, the figures for April, May, and June, 1946, compare favourably with those in many towns in the United Kingdom. In 1942 the infant mortality rate in South Shields, for example, was 83, in Sunderland 81, and in Merthyr Tydfil 82; and one need go no farther back than 1910 to find rates throughout the United Kingdom as high as the highest German figures.

Nutrition Surveys

Sample weighings of persons from all classes of the German population in the British Zone are carried out fortnightly, and the opinion held by the Control Commission is that there has recently been a slight, continuous, overall improvement in nutrition throughout the British Zone, except in Hamburg and Kiel, where the situation has got worse.

A survey of 1,200 factory workers was made at Mulheim in October, 1946. A standard body weight of 67 kg. (10 st. 9 lb. approx.) was taken, and it was found that 17.1% of workers weighed more than this, 82.9% less.

Communicable Diseases

Figures compiled by the Control Commission in Germany are shown in Table IV. They are for four-week periods in the months indicated, and record the number of cases notified in those periods. The dashes mean either that there were no cases in that period or that the figure is not available.

TABLE IV.—*Communicable Diseases Return: 4-week Periods*

	June		July		August		September	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Anthrax	—	—	—	—	—	—	—	—
Diphtheria	6,344	169	5,502	195	5,998	187	7,815	224
Dysentery	313	22	318	18	542	28	277	23
Encephalitis	4	2	7	5	10	6	15	6
Gonorrhoea	9,307	—	9,106	—	8,786	—	8,553	—
Hepatitis, infective	—	—	—	—	58	—	437	4
Malaria	263	2	307	—	220	—	181	—
Meningitis (meningococcal)	36	13	34	21	26	12	31	7
Paratyphoid fever	390	10	427	7	567	9	502	9
Poliomyelitis, acute	15	—	24	4	77	10	103	8
Scarlet fever	1,083	33	1,039	11	1,084	9	1,260	7
Smallpox	—	—	—	—	—	—	—	—
Trachoma	15	—	14	—	34	—	6	—
Trichinosis	—	—	5	—	—	—	1	—
Tuberculosis, lung and larynx	4,256	1,113	3,843	842	3,964	792	3,981	843
Tuberculosis, other	684	162	717	125	768	130	815	112
Typhoid fever	934	59	936	59	1,411	74	1,591	118
Typhus (louse-borne)	1	—	—	—	—	—	1	—
Undulant fever	8	—	6	—	3	—	8	—
V.D., other	—	—	24	—	11	—	20	—
Whooping-cough	—	—	—	—	3,281	16	4,302	22

The figures for diphtheria are high—about twice those obtaining in England before the war. The incidence of dysentery, on the other hand, compares favourably with that of wartime England. Scarlet fever is less prevalent than in England during the autumns of 1943 and 1944.

Deaths from all forms of tuberculosis are not as excessive as individual reports in the daily press would suggest. The population of England and Wales is approximately twice that of the British Zone in Germany. In England and Wales there were 27,754 deaths from all forms of tuberculosis in 1937 and 25,143 in 1942. One-thirteenth of these figures will provide a comparison between deaths from tuberculosis in the British Zone now with those in England and Wales in 1937 and 1942. The highest German figure—1,275, for June—can be compared with the average 4-week figure for England and Wales in 1937 and 1942—namely, 2,135 and 1,934 respectively *for a population of approximately twice the size*. Though for many reasons the comparison cannot be an exact one, the figures nevertheless indicate that tuberculosis in the British Zone now is neither more nor less serious than it was in England and Wales so short a time ago as 1942.

An instruction was issued to Regions in August of this year that in future all *active* as opposed to *open* cases of pulmonary tuberculosis were to be notified. A point to be noted, too, is that proved tuberculous cases receive extra food rations. It is admitted that the figures in Table IV are not as accurate as, for example, those obtainable from the British population; but there is no reason to suppose that they are widely inaccurate.

Hunger Oedema

The incidence of hunger (or famine) oedema is exceedingly difficult to determine. A survey on July 31, 1946, of 2,200 employees at a Hamburg gasworks revealed 90 cases of hunger oedema. A report on hospital admissions as received in London on Nov. 20 is shown in Table V.

TABLE V.—*Hunger Oedema: Report of Nov. 20, 1946*

Town	Approximate Population	In Hospital	Number Admitted in last 4 weeks
Berlin (British Sector)	609,688	177	111
Hanover	300,000	62	26
Münster	70,000	3	9
Düsseldorf	300,000	118	18
Hamburg	1,411,000	1,197	706

Hospital Accommodation

Finally we append some details of hospital beds available to and occupied by the German population in the British Zone as on Oct. 1, 1946.

Beds occupied	218,332	Beds for tuberculosis cases	23,539
Beds available	258,710	Per 1,000 population	1·02
Per 1,000 population	11·2		

REGIONAL HOSPITAL BOARDS

PROPOSED AREAS

The Ministry of Health sent the letter which is printed below to a number of organizations, inviting their observations on the areas provisionally defined for the Regional Hospital Boards to be set up under the National Health Service Act.

Ministry of Health,
Whitehall, S.W.1.
Nov. 15, 1946

National Health Service Act

SIR,—I am directed by the Minister of Health to refer to Section 11 of the National Health Service Act which requires him by order to determine the areas for which Regional Hospital Boards shall administer hospital and specialist services under the Act on his behalf. By virtue of subsection (1) of that Section, the areas must so far as practicable be such that the hospital and specialist services of the area can conveniently be associated with a university having a medical school; and subsection (2) requires the Minister in determining the areas to consult the bodies and organizations which appear to him to be concerned.

Accordingly I enclose for the benefit of any observations a statement setting out the provisional view of the Minister as to the areas appropriate for the purpose, having regard to the considerations stated in Section 11 of the Act and to the needs of the hospital and specialist services. In drawing up this statement, the Minister has also had in mind the following additional considerations to which your attention is drawn:

(1) The size and extent of the areas must be determined primarily by reference to their purpose, which is to provide an area adapted rather for the planning, co-ordination, and provision of hospital and specialist services than for the control and management of hospitals. The latter task will, as stated in Section 12(2) of the Act, be the function of Hospital Management Committees. It follows that the areas can and should be comparatively large in population, and such that each has a natural university medical centre as a focal point. In considering this aspect of the problem the Minister has had regard to the recommendations contained in the Hospital Survey Reports published during the past two years.

(2) In certain Regional Board areas geographical or other circumstances appear to render it necessary that for part of the area there should be set up a Regional Committee of the Board with delegated powers and its own offices. The Minister has in mind such areas as Devon and Cornwall; Hampshire, Dorset, and Isle of Wight; North Lancashire and South Westmorland; and Cumberland and North Westmorland.

(3) The boundaries of Regional Board areas need not and will not prevent the free passage of patients from one area to another. Indeed in some instances at the outset Regional Boards will become responsible for hospitals, etc., in their area which have belonged to and served communities in other areas, and which must continue to do so.

(4) It appears to the Minister that wherever possible the boundaries of the Regional Board areas should coincide with those of local health authorities, in order to secure the maximum of administrative efficiency. Except where other considerations must in his view clearly prevail, the proposed boundaries accordingly follow those of counties and county boroughs.

(5) In some instances it appears that other important factors (e.g., association of the services with the appropriate

medical schools, grouping of related hospitals under the same Regional Board) make it essential to cross local health authority boundaries in defining the boundaries of Regional Board areas. Here again the Minister has sought wherever possible to ensure that the proposed boundaries shall coincide with those of boroughs or county districts.

In view of the clear necessity for allowing Regional Hospital Boards as much time as possible to perform the many preliminary duties which must be completed before Part II of the Act takes effect, it is a matter of some urgency to lay before Parliament the orders defining their areas, so that the Boards themselves may be constituted in the very near future. I am therefore to request that the Minister may receive any observations on the proposed boundaries at the earliest possible date, and in any case not later than Dec. 15.

A similar letter has been addressed to each university with a medical school, and each separate university medical school; the three Royal Medical Colleges and the British Medical Association; the British Hospitals Association and its Area Committees in England and Wales; the King Edward's Hospital Fund for London; the Nuffield Provincial Hospitals Trust; the Association of Voluntary Teaching Hospitals; the County Councils Association; the Association of Municipal Corporations; the Mental Hospitals Association; every local health authority; the Federation of British Industries; and the Trades Union Congress. A further letter with regard to the constitution of Regional Boards will be sent in due course to the bodies concerned.—I am, Sir,

Your obedient Servant,
J. E. PATER.

The following are the areas to be included in the proposed areas of Regional Hospital Boards, listed according to the appropriate University Centre.

Newcastle

Counties of Cumberland, Northumberland, and Durham.

County Boroughs of Carlisle; Newcastle-upon-Tyne and Tynemouth; Darlington, Gateshead, South Shields, Sunderland, and West Hartlepool.

County of Westmorland (Appleby B. and North Westmorland R.D.).

County of York, N. Riding (Middlesbrough C.B.; Boroughs of Redcar, Richmond, and Thornaby-on-Tees; U.Ds. of Eston, Guisborough, Loftus, Northallerton, Saltburn and Marske, and Skelton and Brotton; and R.Ds. of Croft, Northallerton, Reeth, Richmond, Startforth, and Stokesley).

Leeds

County of York, E. Riding.

County of York, N. Riding (except area in Newcastle Region).

County of York, W. Riding (except area in Sheffield Region).

County Boroughs of Kingston-upon-Hull; York; Bradford, Dewsbury, Halifax, Huddersfield, Leeds, and Wakefield.

Sheffield

Counties of Derby (except area in Manchester Region), Leicester (except Hinckley U.D.), Lincoln (Parts of Holland, Parts of Kesteven, except area in Cambridge Region), and Parts of Lindsey, Nottingham, and Rutland (except Ketton R.D.).

County Boroughs of Derby; Leicester; Grimsby and Lincoln; Nottingham.

County of York, W. Riding (C.Bs. of Barnsley, Doncaster, Rotherham, and Sheffield; Borough of Goole; U.Ds. of Adwick-le-Street, Bentley with Arksey, Conisborough, Cudworth, Darfield, Darton, Dearne, Dodworth, Hoyland Nether, Maltby, Mexborough, Penistone, Rawmarsh, Royston, Stocksbridge, Swinton, Tickhill, Wath-upon-Dearne, Wombwell, and Worsborough; R.Ds. of Doncaster, Goole, Kiveton Park, Penistone, Rotherham, Thorne, and Wortley).

County of Stafford (Burton-on-Trent C.B. and Tutbury R.D.).

Cambridge

Counties of Bedford (except area in N.W. London Region), Cambridge, Huntingdon, Isle of Ely, Norfolk, Soke of Peterborough, Suffolk East, and Suffolk West.

County Boroughs of Great Yarmouth and Norwich; Ipswich.

County of Essex (Saffron Walden B. and R.D.).

County of Herts (Royston U.D.)

County of Lincoln (Parts of Kesteven) (Stamford B., Bourne U.D., South Kesteven R.D.).

County of Rutland (Ketton R.D.).

London

(*i*) *North-West.*—Counties of Bedford (Luton B. and R.D., Dunstable B., Leighton Buzzard U.D.), Bucks (Boroughs of Chepping Wycombe and Slough; U.Ds. of Beaconsfield, Chesham, Eton, and Marlow; R.D. of Amersham, Eton, and Wycombe).

Berks (Boroughs of Maidenhead and New Windsor; R.Ds. of Cookham, Easthampstead, and Windsor).

Herts (except areas in Cambridge and N.E. London Regions).

Middlesex (except area in N.E. London Region).

London (Hammersmith (north of Goldhawk Road and Stamford Brook Road), Hampstead, Holborn, Islington, Kensington (north of Holland Park Avenue, Notting Hill Gate, and Bayswater Road), Paddington (north of Bayswater Road), St. Marylebone, St. Pancras, Westminster (north-east of Park Lane, north of Constitution Hill, Birdcage Walk, Great George Street, and Bridge Street)).

(*ii*) *North-East.*—Counties of Essex (except area in Cambridge Region); Herts (Hertford B., U.Ds. of Bishop's Stortford, Cheshunt, Hoddesdon, Sawbridgeworth, Ware: R.Ds. of Braughing, Hertford, and Ware); Middlesex (Edmonton B., Tottenham B., Enfield U.D.); London (Bethnal Green, City, Finsbury, Hackney, Poplar, Shoreditch, Stepney, Stoke Newington).

County Boroughs of East Ham, Southend-on-Sea, and West Ham.

(*iii*) *South-East.*—Counties of Kent and East Sussex; London (Bermondsey, Camberwell, Deptford, Greenwich, Lambeth (east of Kennington Park Road, Brixton Road, and Brixton Hill), Lewisham, Southwark, Woolwich).

County Boroughs of Brighton, Canterbury, Eastbourne, and Hastings.

(*iv*) *South-West.*—Counties of Surrey and West Sussex; Hampshire, Isle of Wight, Dorset (except area in Bristol Region), Wilts (Boroughs of Salisbury and Wilton; R.Ds. of Amesbury, Mere and Tisbury, and Salisbury and Wilton); London (Battersea, Chelsea, Fulham, Hammersmith (south of Goldhawk Road and Stamford Brook Road), Kensington (south of Holland Park Avenue, Notting Hill Gate, and Bayswater Road), Lambeth (west of Kennington Park Road, Brixton Road, and Brixton Hill), Paddington (south of Bayswater Road), Wandsworth, Westminster (south-west of Park Lane, south of Constitution Hill, Birdcage Walk, Great George Street, and Bridge Street)).

County Boroughs of Bournemouth, Croydon, Portsmouth, and Southampton.

Oxford

Counties of Berkshire (except area in N.W. London Region), Buckingham (except area in N.W. London Region), Northampton, and Oxford.

County Boroughs of Northampton, Oxford, and Reading.

Bristol

Counties of Cornwall, Devon, Gloucester, Somerset, and Wilts (except area in S.W. London Region).

County of Dorset (Boroughs of Bridport and Lyme Regis; Sherborne U.D.; R.Ds. of Beaminster, Bridport, and Sherborne); Isles of Scilly.

County Boroughs of Bath, Bristol, Exeter, Gloucester, and Plymouth.

Cardiff

The whole of Wales and Monmouth.

Birmingham

Counties of Hereford, Leicester (Hinckley U.D.), Salop, Stafford (except Burton-on-Trent C.B. and Tutbury R.D.), Warwick, and Worcester.

County Boroughs of Birmingham, Coventry, Dudley, Smethwick, Stoke-on-Trent, Walsall, West Bromwich, Wolverhampton, and Worcester.

Manchester

Counties of Cheshire (except area in Liverpool Region), Lancashire (except area in Liverpool Region), and Westmorland (except area in Newcastle Region).

County of Derby (Boroughs of Buxton and Glossop, U.Ds. of New Mills and Whaley Bridge, and R.D. of Chapel-en-le-Frith).

County Boroughs of Barrow-in-Furness, Blackburn, Blackpool, Bolton, Burnley, Bury, Manchester, Oldham, Preston, Rochdale, Salford, and Stockport.

Liverpool

County of Cheshire (C.Bs. of Birkenhead, Chester, and Wallasey; Boroughs of Bebington, Congleton, and Crewe; U.Ds. of Alsager, Ellesmere Port, Hoylake, Hoole, Knutsford, Lymm, Middlewich, Nantwich, Neston, Northwich, Runcorn, Sandbach, Winsford, and Wirral; R.Ds. of Bucklow, Chester, Congleton, Nantwich, Northwich, Runcorn, and Tarvin).

County of Lancashire (C.Bs. of Bootle, Liverpool, St. Helens, Southport, Warrington, and Wigan; Boroughs of Crosby and Widnes; U.Ds. of Abram, Ashton-in-Makerfield, Aspull, Billinge and Winstanley, Formby, Golbourne, Haydock, Hindley, Huyton with Roby, Ince-in-Makerfield, Litherland, Newton-le-Willows, Ormskirk, Orrell, Prescott, Rainford, Skelmersdale, Standish with Langtree, and Upholland; R.Ds. of Warrington, West Lancashire, Whiston, and Wigan).

ROYAL VICTORIA HOSPITAL, BELFAST

The growing concern felt by the Board of Management over the financial position of this large voluntary hospital was the subject recently of editorials and articles in the press of Northern Ireland. Though in the preceding three years the hospital's income had exceeded expenditure there remained at the end of 1945 an accumulative adverse balance on revenue account of approximately £25,000. In the first six months of 1946 expenditure has exceeded income by £17,800 and the net total of gifts, endowments, bequests, etc., received during this period has amounted only to £9,000. Over the same period last year the amount received was £15,000. At recent meetings of the Board of Management the causes of this increased expenditure and decline of the hospital's income were discussed and it was pointed out that increased expenditure was inevitable in view of the rise in nurses' salaries and in wages generally and because of the increased price of commodities. Against this there had been a decline in the working people's contribution attributable to the fact that more people were employed last year mainly on war work. These reasons only partly explained the situation, however. More important still was the misunderstanding that had arisen in the minds of the general public over the increase in National Health contributions from 1s. 1d. to 2s. Many people apparently had the impression that the extra money was being levied with the object of benefiting the hospitals. It was unfortunately only too true also that the prospect of the Government taking over all assets of the hospital had affected donations and bequests so that the number of these has shown a tendency to fall off. A serious financial crisis was, therefore, likely to arise until the policy of the Government in respect of the inauguration of the National Health Service was made clear. In the past the hospital had relied for over 50% of its income on the activities of the Working Men's Committee and their supporters, whose admirable efforts in the past had been largely responsible for the sound financial situation of the hospital to date. At a recent meeting a resolution was unanimously adopted that the working people's contributions should be increased by 1d., and a drive is being instituted to effect this through the co-operation of the city's large industrial concerns and the employees in them.

The annual report of the hospital for the year 1945 showed that there were 9,616 admissions to the wards distributed thus: 3,120 to the medical wards, 4,918 to the surgical wards, 1,642 to the gynaecological wards, and 536 to the eye, ear, nose, and throat department. The average daily number of beds occupied was 498 and the average stay of each patient in hospital was 18.8 days. There were 545 deaths during the year, and of these patients 172 died within 48 hours of admission. Excluding those who were moribund at the time of admission the death rate works out at under 4%. In the out-patient department the number of new patients was 57,066—a high figure and one which reflected the important part played by the hospital in the health services of not only the City of Belfast, but the province as a whole. The hospital had been one of the centres taking part in the clinical trials of penicillin on behalf of the Medical Research Council of Great Britain, and special interest was attached to the results achieved in subacute bacterial endocarditis, the results of which have been incorporated in a report made to the M.R.C.

THE NURSING PROBLEM

Sir ERNEST ROCK CARLING gave an address at the nurses' prize-giving and annual reunion at the Southend Municipal Hospital, Rochford, Essex, on Oct. 19. He suggested that with impending changes in the health service of the country, when the basis of the whole hospital and sickness services was being examined, it was necessary to look once again with fresh eyes at the nursing service, without which the rest could not function. The whole nursing problem should be reconsidered in the light of changed conceptions regarding hospitals themselves. The present generation realized that hospitals were only one link in the chain of agencies dealing with a social problem; that it was not enough to bring acute illness to an end; that recovery of full health and efficiency until return to occupation was in a sense more important, because without it the results of curative measures were dissipated or thrown away. Sir Ernest suggested that the nursing problem likewise was one which covered the home, the clinic, the school, the factory, the whole environment of the healthy; that all these departments of service were equally honourable and that they could not thrive in isolation.

The Need for Interchange

The nurse in a mental hospital must not be left there for ever; the district nurse must not be so cut off from hospital that her professional knowledge rusted. There must be interchange, seconding, pooling of experience; and that would not come about as long as hospitals jealously limited their own trained nurses to their own institutions. The parochialism about hospitals, at any rate about some voluntary hospitals, in regard to their nurses, though commendable in the 18th and 19th centuries, was deplorable in the 20th. In a few months' time regional boards would be appointed and would proceed to set up local management committees for groups of hospitals. They would have hospitals of every kind under their care—general, special, mental, infectious disease, tuberculosis, and long-stay hospitals, cottage hospitals, and so on. Could it be imagined that the nursing service any more than the accident service or the maternity service, or the mental service, would remain isolated in single institutions? Could the full education of the nurse exist without transference to hospitals of many types? Medical students would certainly broaden the basis of their education, and so would nurses.

Broadening the Field of Recruitment

The enormous demands for nursing upon the total woman-power of the country could not be met from the yearly quota of girls getting the School Certificate; there were not enough of them. That meant a broadening of the field of recruits, whether one liked it or not, and in his opinion examination standards were a false guide to the women wanted. Sir Ernest Rock Carling outlined a scheme to meet the future situation. This would rest on a basic training in the art and craft of nursing of two years' duration, which everyone must take, and at the end there should be entitlement to the name "nurse," not "assistant nurse." This should be open to all girls without any difficult educational test. There should then be a further term of 1½ to 2½ years for all whose educational attainments were adequate. In it some degree of specialization might begin early, so that in the end they might attain the title of nursing sister (surgical), (children), (obstetric), (tuberculosis), (mental), (school), and so on. From the very best of this class should be chosen those who were to graduate from a staff college. In every region or group of regions there should be a staff college for the supply of sisters-in-charge of units or teams, for sister-tutors, for wardens, and for matrons. It should be allied to the university.

MEDICAL INSURANCE AGENCY

At the Trocadero Restaurant, on Nov. 22, the Medical Insurance Agency gave a dinner to some sixty representatives of the medical and insurance worlds. The toast of the "Medical Insurance Agency" was proposed by Mr. E. A. J. Heath, manager and actuary of the Medical Sickness, Annuity, and Life Assurance Society. In replying, Sir Francis Fraser described the many links between insurance and medical practice. The toast of "Our Guests" was proposed by Mr. A. N. Dixon, the manager of the M.I.A., who has recently returned from service with the R.A.F. Mr. Dixon welcomed each of the many guests. His toast was responded to by Mr. W. W. Williamson, general manager and actuary of the Norwich Union Life Insurance Society. Mr. Williamson picked up a remark made by Sir Francis Fraser to the effect that medicine had done much to increase the average age of the population, and suggested that in the experience of his Society this increase seemed to affect particularly its annuitants.

In the course of the dinner it was announced that in the first ten months of this year the M.I.A. had secured proposals amounting to well over £2,000,000. Since the foundation of the Agency in 1907 doctors themselves have benefited to the extent of £175,000, and just over £75,000 has been handed over to medical charities and particularly to Epsom College and the Royal Medical Benevolent Fund.

APPOINTMENTS IN IRAQ

The following staff is urgently required by the Government of Iraq: Professors of obstetrics and gynaecology, diseases of the ear, nose, and throat, ophthalmology, bacteriology, pathology, chemical pathology, physics; and director of the parasitological laboratory. The appointments will be for three years in the first instance, but a contract for a shorter period may be considered. The salary is at the rate of Iraq dinars 150 a month, and there is in addition a cost-of-living allowance, at present I.D.24 a month (I.D.1=£1). Free first-class passages are provided. Application should be made to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1.

Reports of Societies

CONTROL OF AIR-BORNE INFECTIONS

A meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine was held on Nov. 22, with Dr. H. J. PARISH in the chair, for a discussion on modern methods in the control of air-borne infections.

Dr. ROBERT CRUICKSHANK, in some introductory remarks, defined air-borne infection as infection by inhalation. There were only two strictly air-borne means of spread—dust, and what Wells had called "droplet nuclei." He believed that these two might prove more important in the spread of infection than the direct droplet. One way of assessing their relative importance would be to eliminate one of the variables and observe the effect. The task was to supply clean, safe air intra-murally without danger or discomfort to the community, a task which was more difficult and complex than the supply of clean, safe milk or water.

It was true that the mortality rate for air-distributed infections had markedly declined, but there was no appreciable decline in morbidity except in the few diseases, such as smallpox and diphtheria, which could be controlled by prophylactic vaccination. Respiratory infections such as colds, catarrhs, influenza, sinusitis, and bronchitis still seemed to be as prevalent as they were a century or more ago. In the U.S.A. it had been shown that individuals in different cross-sections of the community averaged three colds a year. In this country few data were available, though certain local surveys had been made. He referred, among others, to Smith's observations in Glasgow in a poor-class community which showed that two-thirds of all the cases reporting sick within a year were cases of acute respiratory disease, and more than half the working time lost was due to this cause. In boarding schools 40–50% of sickness absenteeism was due to nasopharyngeal infections and influenza. A recent analysis made by the Wartime Social Survey, taking random samples of households, had shown an incidence of over 40% of all illness as due to acute respiratory infections. In order to find out which were the important "community foci" of infection—e.g., railway carriages and other public transport, schools including nursery schools and nurseries, badly ventilated offices, overcrowded factories, cinemas and other places of entertainment, modern methods for bacterial sampling of the air could be utilized. Standards for clean air should be established, using either the total bacterial content or an indicator organism like *Str. viridans*. New "portable" methods for measuring ventilation were also being devised.

We were still largely ignorant of the relative importance of droplets, dust, and droplet nuclei in the spread of different respiratory infections. One method of assessment was to eliminate one of the variables and note the effect. He mentioned the classical work of Alison Glover on the effect of bed spacing in the control of cerebrospinal meningitis and a recent American study on the value of "double-bunking" in reducing the epidemic spread of acute respiratory disease. Dust-control measures were apparently effective in controlling streptococcal throat infections but not virus infections of the upper respiratory tract. Ultra-violet light in schools seemed to prevent the spread of such specific fevers as measles, mumps, and chickenpox but not the common cold.

Streptococcal Cross-infections

Dr. JOYCE WRIGHT gave a description of the control of streptococcal cross-infection in the measles ward at the North-Western Hospital, London, and later at the Eastern Hospital. The object of the investigation was to discover whether the control of dust would reduce the number of haemolytic streptococci in the ordinary air. The method employed was to apply dust-laying oils to the bedclothes and to other contents of the ward. In the first results there was a 91% reduction in the total bacteria and a 98% reduction in haemolytic streptococci in the air of the oiled ward as compared with the controlled unoiled ward. The incidence of cross-infection also declined steeply. The results encouraged the belief that dust was an important vehicle for streptococci in wards, and that oiling was successful in its control. When the investigation was repeated the difference, for some reason, was less marked, perhaps because it was made at a different time of year; but she thought it quite possible that in a future measles epidemic oiling would prove satisfactory in the reduction of streptococcal cross-infection.

Mr. F. COURTNEY HARWOOD (Director of Research, British Launderers' Research Association) gave an account of suitable emulsifiers for the oiling of hospital bedclothes, a procedure which he and others had described in detail in the *British Medical Journal* for May 6, 1944. The emulsifiers used were the kation-active "fisanol C" and the anion-active "teepol," but the use of other commercial emulsifiers was possible. It was necessary, along with the oiling, to maintain good laundry practice. He mentioned one well-known hospital which, after oiling its bedclothes for two years, complained that the oiled blankets were not lasting as long as the unoiled, and were unpleasant in various ways, but on investigation it was found that the blankets had never been washed since the oiling began; they had been oiled at intervals and given two rinsings in plain water after each oiling. The addition of oil to fabrics in no way impoverished them if proper precautions were taken. No signs of dermatitis had been noticed among patients or nursing staff after the oiling of the blankets. Cross-infection since the adoption of the oiling technique had been much diminished. The cost of the materials used in the preparation had been 3½d. per blanket, but the cost was being brought down to the level of about 1½d.

Use of Chemical Agents

Dr. O. H. LIDWELL, a collaborator with Dr. R. B. Bourdillon at the National Institute for Medical Research, spoke of the use of chemical agents for the purpose of reducing the content of infective material in the air. He said that all the methods were still in the experimental stage, and none of them could be said to be entirely efficient or without difficulty in application. There were at present no practicable methods of assess-

ing the degree of contamination of the air by virus infections; all the work had had to be done on bacterial infections, yet from the point of view of cross-infections those caused by viruses were more important and widespread. He described the experiments with hydrochloric, lactic, and other acids. Lactic acid had been investigated in more detail than any other agent. It became very much less effective at the lower relative humidities, and at below 40% humidity it was almost if not quite ineffective. Its practical drawbacks were that it was not very easy to distribute in the air of a room, and at concentrations only a little above the working level it became irritant. Glycol seemed to show promise, but as yet there was not much experience of it. The phenolic substances were disappointing in this field. Resorcinol was effective in certain situations, but difficult to maintain in concentration in the air. Ultra-violet light had been mainly up to the present an American experiment, but its suitability for schools was being tried out in this country. Its effect upon the total dust-borne organisms was small but definite.

Dr. M. MITMAN described some experiments in aerial disinfection at Joyce Green Hospital by means of a germicidal mist, resorcinol. The results were not as promising as was hoped. No untoward effect on patients was noted, but discoloration of walls and ceilings took place. The simplicity of the method, however, justified its further investigation.

Major CUNLIFFE illustrated some experiments in the dust control of surgical wards by the oiling of bedclothes. The number of streptococci was reduced, and there was a significant fall in the incidence of streptococcal infections. Dr. J. L. BURN, who also showed illustrations of some experiments, pointed out the importance of disinfection of the floor. Under modern educational methods it was on the floor that many young children carried out their work and play.

General Discussion

Dr. O. C. STALLYBRASS said that two of the greatest recent advances in epidemiology had been the work on viruses and the work on air-borne infection. Droplets were the major medium of infection in temperate climates, and second only to insect bites in hot climates. During a measles epidemic the oiling of blankets was undertaken at his hospital at Liverpool, with complete satisfaction to the matron and nurses. Dr. STANLEY BANKS said that during the last six months, since his return from war service, he had been impressed by the almost complete absence of cross-infection in the scarlet-fever wards of his hospital. He hoped that in the zeal for these new methods the older methods would not be forgotten—ventilation, bed-spacing, chemoprophylaxis, and chemotherapy.

Dr. ALLAN MCFARLAN pleaded for a distinction between merely bacteriological cross-infection and clinical cross-infection in which there was definite illness. He hoped there would be no wholesale oiling of bedclothes. With present commercial methods there would always be a temptation to market these preparations and put them forward as essential to all hospitals. It was worth while seeing whether the law of diminishing returns did not apply here.

Dr. J. M. ALSTON said that entirely air-borne infection within a ward, when all the secondary cases could be shown to be the result of such infection, was a comparatively limited thing. From a practical point of view there could be no doubt that contact had a good deal to do with certain infections. He thought there was a case for a more adequate toilet of the nose, and suggested the impregnation of handkerchiefs. Dr. WILLIAM GUNN spoke appreciatively of Dr. Joyce Wright's work at the North-Western Hospital. He was not in favour of the oiling of blankets as a matter of invariable routine. He thought it was a valuable method to be kept in reserve for use when necessity arose.

American Experience

Prof. RONALD HARE said that in May last he attended a meeting of the Society of American Bacteriologists at Detroit. Very extensive ultra-violet light installations were demonstrated, but the results did not appear to be commensurate with the trouble and expense. Those who favoured triethylene glycol had an almost equally large installation, but here again the results did not seem to justify the outlay. Striking results were obtained when oil was used on the bedding, but he could not remember what the infection rate was. Much work had to be done in different centres before one ward could be compared with another or one hospital with another. It might be possible to prevent bacterial infections with various methods of ventilation and house-cleaning in sleeping quarters, but it would be practically impossible to prevent virus infections. This was brought vividly before him when he was in Canada. The Mackenzie River in the North-west was frozen in winter, and in the spring a steamer made its way along the newly thawed river to the Arctic. One year the boat, when it left the Great Slave Lake, carried an influenza infection, and from that point onwards all down the river, according to the reports from the Mounted Police posts, the whole population—natives, whites, and half-breeds—were infected with influenza. That could hardly be said to be due to blankets or anything like that. What was possible in the case of bacterial infections would almost certainly not be possible for virus ones.

Dr. CRUICKSHANK, in reply, reminded the meeting that the old antidotes still maintained their importance—good ventilation, which would overcome the effect of crowding; daylight, which had a bactericidal value (whether fluorescent lighting would help also in that respect was not yet established, but he thought it might); and humidity, which did help to destroy both bacteria and viruses.

THORACIC SURGERY

At a meeting held at the Royal Devon and Exeter Hospital on Oct. 17 of the Devon and Exeter Medico-Chirurgical Society Prof. MILNES WALKER paid tribute to the work of Major Harken, of the U.S.A.M.C., on the surgery of war wounds of the heart, and described a case in which a bullet had twice slipped through the tricuspid valve on attempts at removal before a third operation was finally successful. He discussed the surgery of intrathoracic goitre and thymectomy for myasthenia gravis, with special reference to thyrotoxic myopathies, and suggested that some of the cases benefiting from thymectomy might have done so because of the partial thyroidectomy performed at the same time. He then described the surgery of the oesophageal pouch, achalasia of the cardia, and carcinoma of the oesophagus, stressing the value of early diagnosis in carcinoma by means of the oesophagoscope and *x* rays and the necessity for team work between surgeon, physician, radiologist, and pathologist.

X-ray Therapy Disappointing

Mr. BELSEY said that in his experience the results of *x*-ray treatment of carcinoma of the oesophagus as studied by the oesophagoscope were not impressive. Some combined attack by the surgeon and the radiotherapist on the primary growth might hold out better prospects. Dr. WROTH agreed that the encouraging early results obtained by *x*-ray therapy had proved disappointing. Dr. FULLER mentioned that a barium swallow did not reveal an early case and that a suspicious case of dysphagia might need following up before the diagnosis could be confirmed. He described the unfortunate sequelae of cases he had seen—e.g., heavy burning of the skin from *x* rays, death from mediastinitis, or early metastasis after operation. Dr. Wroth agreed that a barium swallow could not exclude a carcinoma of the oesophagus in its early stages.

Strictures of Oesophagus

Mr. ETHERINGTON WILSON asked if aspiration of an intrathoracic goitre was not a great technical aid in operation and whether suture of the fascia surrounding an oesophageal pouch to the stump after excision was not an added safeguard. Mr. HOOD mentioned the common occurrence of oesophageal strictures in Russia due to children drinking sulphuric acid used to dry the air between double windows. Mr. Belsey mentioned the occurrence of multiple oesophageal strictures and the difficulty of outlining a lower unsuspected one by barium swallow. He thought that the oesophagoscope had great advantages in that respect.

Prof. Milnes Walker in reply agreed that the oesophagoscope was of more value than a barium swallow. He preferred to

leave a drain down to the stump of an oesophageal pouch rather than suture the fascia, because a fistula, usually transient, sometimes formed. Aspirating a retrosternal goitre sometimes helped, but an intratracheal anaesthetic, as Sauerbruch advocated, was even more important as a means of avoiding splitting the sternum. He had seen a case of two separate carcinomata of the oesophagus separated by one and a half inches of healthy oesophagus.

DIFFICULT LABOUR IN MULTIGRAVIDAE

At a meeting of the North of England Obstetrical and Gynaecological Society held at Liverpool on Oct. 4, papers were read by Drs. BRYAN WILLIAMS, A. A. GEMMELL, and C. P. BRENTNALL.

Dr. WILLIAMS, discussing "some factors causing difficult labour in multigravidae," took as his criterion an individual who had had at least eight previous children born normally, and did not include, as an abnormality, a low forceps delivery with her previous child, an unaccountable stillbirth, antepartum haemorrhage, or any other complication not directly associated with the actual birth of the child. After eliminating such conditions he was left with twenty-three cases in which difficulty was experienced in a subsequent labour. On the whole he found that the cause of the difficult labour was either an unusually large child, some degree of contraction of the pelvis, or both. He proved that there was a marked tendency for the children of later pregnancies to be larger than their older siblings, and described how in many cases the mother's pelvis became definitely contracted. This pelvic contraction, probably due to minor osteo-malacic changes in the bones, was acquired after the birth of her first or second child. This was confirmed by the experience of observers in countries such as China where similar changes in the bones were well marked and very prevalent, and no doubt the cause was hypovitaminosis.

Micturition after Vaginal Plastic Operations

Dr. A. A. GEMMELL recommended the instillation of 1 fl. oz. (28 ml.) of 0.5% "mercurochrome" into the bladder directly after operations such as those for prolapse, and described his results in sixty-three cases treated by this method and compared them with fifty cases treated without the instillation. Of the first group 9.5% needed catheterization compared with 72% in the other group. He was strongly of the opinion that this was an excellent method of dealing with this post-operative complication, and he felt that it was due to the irritant action of the solution.

Techniques for Colporraphy

Dr. C. P. BRENTNALL summarized the history of the colporraphy operation in Manchester, pointed out the different techniques of Fothergill and of Donald, and gave his reasons for advocating the former. This paper was regarded as of the utmost importance in settling the controversy which has raged around the names of these two great men.

USE AND ABUSE OF SULPHONAMIDES

The meeting of the Liverpool Medical Institution, held on Oct. 24, was in the form of a symposium under the chairmanship of Dr. G. F. RAWDON-SMITH.

Several viewpoints on the importance of sulphonamides in prophylaxis; their indiscriminate use in infections, particularly whether diagnosis before treatment aiming at precision or treatment before diagnosis aiming at expediency should be the rule; the use of subclinical doses in undiagnosed cases; the rarity of toxic effects if adequate nursing, fluid intake, and rest in bed were insisted upon; and early fall of temperature as insufficient evidence of recovery from the pneumonic process—were advanced by the principal speakers, Drs. DOUGLAS RIDING, C. A. CLARKE, and A. O. ROSS, followed by Drs. R. W. BROOKFIELD, F. GLYN-HUGHES, LENNOX JOHNSTON, G. WILLIAMSON, and G. Y. YARDUMIAN. The sudden arrest of a cerebrospinal meningitis epidemic by prophylactic treatment of the 75,000 inhabitants of a Mexican town, and the very reduced incidence of sensitization-dermatitis in England in contrast with the Tropics, were among the interesting points made.

Correspondence

Vital Statistics in Western Europe

SIR,—Down to 1939 any private citizen interested in the vital statistics of Western Europe had no difficulty in satisfying his curiosity. It is true newspapers hardly ever printed any information because foreign vital statistics had no, and our own very little, news value; but official publications were available in many libraries. Since 1939 there has been no information.

It is now more than a year since part of Germany passed under British control, and I recall official intimations in your advertisement columns that the services of persons familiar with, among other things, vital statistics were needed. No doubt these were obtained, and it would be a poor compliment to the staff of the occupying power to doubt whether gross death rates and index figures of mortality at ages under one year are being prepared. But, so far as I know, no vital statistical information has been published.

I shall not ask your space for a dissertation on the value of death rates as sanitary indicators, and I have no doubt our colleagues in the Military Government of Germany use them. What I do plead is that these data should be made available to private citizens. As things are, we (by "we" I mean the large number of medical men and of students of social phenomena who have an elementary knowledge of vital statistics) cannot judge the significance of passing events. At irregular intervals we read that the food position in Germany is more, or less, grave; that expert A takes a serious view of the position or that expert B finds matters not too bad. Then a "crisis" develops; Mr. Victor Gollancz and the Bishop of Chichester take the field in the *Times*; more sensational papers talk about riots, military precautions, and so forth. But we have no statistical information, not one death rate.

If regularly, say once a month or even once a quarter, the medical press were able to publish a summary of current vital statistics in the British zone, we should be able to form some judgment. I do not need to be told that in a devastated country ruled by foreigners vital statistics of the standard set by our own General Register Office cannot be had; the best should not be made the enemy of the good or even tolerable. What I *do* fear is that official reticence, a dread of giving information which might be misused, is responsible for the complete public ignorance which prevails.—I am, etc.,

Loughton. MAJOR GREENWOOD.

The Plebiscite

SIR,—Having completed my plebiscite form in the negative with a reservation, after careful and prolonged consideration, I am wondering if my own difficulty in deciding which way to vote is peculiar to myself or has been experienced by others. While I am in agreement with the objections of the Council of the B.M.A. on one point I find myself agreeing with the Minister on all the remainder. As I understand it, the purpose of refusing to negotiate with the Minister is to show him that the present Act is unacceptable to us. The one point which is unacceptable to me—i.e., the basic salary—is so vital to my mind that it compels me to insert "No" on my ballot paper.

This referendum will give the Negotiating Committee a clear-cut decision, but it may also give them quite the wrong impression as to what there is in the Act which makes the majority of the voters feel that it would not produce an efficient service for the patient if put into operation as it now stands. They will also be unable to enlighten the Minister on this point. A further referendum by means of which we could indicate which of the official B.M.A. objections are actually our own would serve to show the strength of feeling on the various principles involved. I, for one, cannot see my way to give any undertaking not to enter the service by giving a negative vote on my ballot paper, while the referendum gives me no opportunity to indicate which of the principles I am prepared to treat as vital. The dust of political battle seems to

me to obscure the real issue. Surely what we really want is a health service so framed as to enable us to do our best for our patients and to get the best in the way of investigation, advice, and treatment for them when we cannot give it ourselves. An efficient service from the patients' view-point will be bound to be a satisfactory service from the doctors' angle.

I submit that, though the present referendum may "bring the Minister to heel" and give rise to "victory celebrations" of varying kinds, a more detailed ballot such as I have indicated would make it far more constructive and might assist the Minister and our legislators to provide for our patients what the bulk of them would appear to need badly—namely, an efficient insurance service in which we as their doctors can give them of our best.—I am, etc.,

Bournemouth. ROBERT RISK.

SIR,—Dr. Dain, at the end of his Exeter address, referring to the plebiscite, says: "Here we have an opportunity of saying that we will not take part in a service that does not concede our principles. . . . We should be infinitely stronger in talking about terms and conditions if we had first by our own efforts secured the acceptance of our principles." Yet we are being asked to vote on whether we shall negotiate on "terms and conditions" *before* we vote on acceptance of "principles." This is certainly putting the cart before the horse, and I am afraid some doctors may think that by saying "Yes" to the plebiscite they are in fact voting for negotiating with the Minister on "principles." Whereas, of course, the fact is that the Minister flatly refuses to negotiate on our "principles" and even the House of Lords has been unable to secure the acceptance of our fundamental "principles." The Bill is now on the Statute Book in opposition to the overwhelming vote of the representative body of the profession.

We should have been asked whether we are willing or not to work the National Health Service Act as it now stands on the Statute Book. If the answer is "No," then the question of terms and conditions does not arise. If the answer is "Yes," then the negotiating of terms and conditions will logically follow. However, it is too late to change the question, but I think the next issue of the *Journal* should contain prominent emphasis on the points above mentioned, for it is most important that there should be as few "Yes" answers as possible. Ruin stares us in the face.—I am, etc.,

Ilford. N. BEATTIE.

SIR,—Reflection on the plebiscite question fills me with grave foreboding, for without a strongly negative lead I consider it a blunder of the first magnitude. The question which seems to invite the answer "Yes" surely assumes that the Minister is prepared to enter into discussion with our Negotiating Committee. Is this not a dangerous assumption to make when time and time again we have been informed by our representatives that the Minister has continually refused to negotiate and has remained consistently uncompromising? In the absence of any indication that the leopard has changed its spots I submit that the question is misleading.

Accepting the question as it stands, how is the reply to be interpreted? I can well imagine that a resounding affirmative vote would bring joy to the Minister's heart and that he would regard it as a signal to proceed on his dictatorial way. On the other hand, can anyone doubt but that a strongly preponderating negative reply would cause an intense shock to his nervous system and alter his outlook? This brings me to the paradoxical conclusion that anyone who desires the Negotiating Committee to enter into discussions with the Minister on the Regulations authorized by the National Health Service Act must answer "No."—I am, etc.,

Birmingham. ALASDAIR McI. SMITH.

SIR,—I have been in general practice now for just on twenty years, and since 1930 have been in a working-class practice in Southampton. In 1939 I found myself in command of a Territorial hygiene company, and as such was graded as a specialist in military hygiene, and spent the next six years in preventive medicine and had much to do with advising on accommodation, food supplies, and how to make full use of the ration in order to ensure that each individual absorbed the full calorie value of the food. One of my greatest difficulties was trying to make the theories of the experts work in practice, and as far as food was concerned I regret to say that I largely failed.

On my release from the Army I returned to general practice in October, 1945, imbued with the spirit of preventive medicine and realizing that in the past I and other G.P.s gave too little thought and action to this branch of medicine, for only the G.P. can do any real work in this sphere. What do I find? I find my waiting-room full of patients with minor ailments, all preventable—coughs and colds, dermatitis and furunculosis, lumbago and sciatica, and neurosis. On visiting my patients I found overcrowding such as I have never experienced before (eight-nine adults living in a council house, with a few children thrown in), food a little better than starvation level, with the supply of dairy produce below the safety line.

Meantime, statisticians publish figures to show that the health of the nation is excellent (there have been no major epidemics); industry calls for greater effort and condemns absenteeism. The conditions cited above never reach the statistician, but there can be no reduction of absenteeism until they are eliminated, and this can only be done by a virile housing programme and a considerable, urgent increase in the supply of dairy produce—milk, cream, butter, and eggs.

Being convinced of this from *practical* experience, I am doing what I can in the treatment of my patients to supply the deficiency, to get them fit in the minimum time and back to industry; in this I am greatly handicapped by the fact that the number of priorities is strictly limited to an inadequate number of diseases. At this stage the Minister of Food "cracks the whip," making irresponsible accusations of "lax" certification, and the tragedy of the position is that doctors rush into print to *excuse* themselves. Dr. A. K. Young (Nov. 16, p. 751) alone has the courage to be forthright and tell the Minister that his patients' interest comes first.

If the general practitioner to-day is afraid to face the facts, which only he can see in the homes of the people, and is to be told by a Minister, surrounded by his experts and theorists, when he shall issue milk certificates, what will the position be when the new State medical service is in being? We are asked this week-end to consider the future of medicine; and although I have long been an advocate of State medicine, there is much in the present Act which is detrimental to medical practice. But, if only for the reason stated above, I must answer "No" to the plebiscite.—I am, etc.,

Southampton. JAMES G. McDOWELL.

SIR,—I sincerely hope that every member of the medical profession will read or has read Dr. Alfred Cox's letter in your *Journal* (Nov. 9, p. 707). I know of several doctors who were going to answer "Yes" to the plebiscite because of the statement in the plebiscite, "A decision to enter upon discussions does not involve a decision to enter the Service." This is obviously true. On the other hand, the answer "Yes" is in fact condoning the Act and is a victory for Mr. Aneurin Bevan. When this was explained in detail they changed their answer to "No."

Let there be no confusion at this time when we are fighting for the life or death of the profession. Unless we wish to become full-time Civil Servants we must answer "No" to the plebiscite.—I am, etc.,

Mansfield. HUGH TATE.

SIR,—Dr. Dain's admirable address at Exeter has clearly stated the problem of the National Health Service Act. All the good points in it and more can be part of a new Bill really serving Health. The present Act is unmasked as a tremendous political attempt to enslave us all—profession, hospitals, and people alike—under State control. The time for negotiations is past; they have failed. Our duty is clear. Let us all in the name of justice and liberty answer the plebiscite at once, and answer "No."—I am, etc.,

Winchester. SYBIL TREMELLEN.

SIR,—I should welcome the opportunity to add my appreciation of the most admirable communication from Dr. Alfred Cox (Nov. 9, p. 707) emphasizing the need for retaining the freedom of disposal of practice goodwill plus the necessity for remuneration to be placed on a capitation basis. This commendable letter needs to be read in conjunction with your leading article in the same issue, wherein it is clearly shown that the postulation of a basic salary emanates from the urgency of obtaining satisfactory certification. May I be permitted to comment that no perplexity need now exist in completing the form of plebiscite and in offering an immediate rejection to legislation which promotes financial instability and then shelves the onus of its own responsibilities in the matter.—I am, etc.,

Tipton. L. H. EUNSON.

SIR,—Can Mr. Bevan's Act, even after negotiations, be altered to agree with our principles? The answer is "No." The answer to the plebiscite question is, therefore, "No."—I am, etc.,

Glasgow. A. L. COWAN.

SIR,—I hope it is not too late to appeal to every member of the medical profession—be he or she on the staff of a teaching or a non-teaching hospital, a medical officer of health, or a general practitioner—in replying to the question submitted by the British Medical Association on the subject of the National Health Service Act, to consider the interests of the profession as a whole, and sectional interests only in that framework. Whatever decision we make, we should aim as far as possible at unity.—I am, etc.,

London, W.8. HAROLD H. SANGUINETTI.

SIR,—If we say "Yes," we are still free to say "No." If we say "No," we are no longer free to say "Yes." Carry on, Freedom.—I am, etc.,

Leeds. W. S. MACDONALD.

SIR,—In the issue of the *Journal* for Nov. 9 there are two contributions which I would urge every member of my profession to study and ponder and study again. The first is the letter on the plebiscite by my old friend and companion-in-arms, Alfred Cox. Like him I suppose I must consider myself an old soldier, but like him I scent the battle from afar. Perhaps those who are, or may soon be, in the thick of the fray may not be unwilling to consider the views of those who, in their time, fought *and won* many a pitched battle on behalf of their profession. I have italicized "and won" because this brings me to the other contribution—namely, the address by Field-Marshal Viscount Montgomery on "Morale in Battle."

Dr. Cox mentioned the waverers who plead that it (the enslavement of the medical profession) is "inevitable." I believe that if anything can bring failure in the coming struggle it will be this attitude of defeat. Lord Montgomery gives his recipe for morale, and as one of the contributory factors he mentions success. Now in my talks with members of my profession, both personal and at Divisional meetings, one thing has surprised me more than any other—namely, that the younger members are unaware of, and the older members seem to have forgotten, the outstanding success which attended our fight against the Government on the capitation fee in 1923. On that occasion, as secretary of a Division, I obtained the resignations of all but two of the local panel practitioners; and this was the general experience throughout the country. The result was the immediate collapse of the Government department and the granting of our reasonable demands. Exactly the same thing has just now taken place, again over the capitation fee. Success is ours if we will but have the courage to stand together (Montgomery's "discipline and comradeship").

But let there be no mistake on the issues of this plebiscite. A policy of appeasement is fatal. If once we begin to negotiate on the regulations we are doomed. Dr. Cox places the issues squarely before his readers. Everything is at stake. No matter how gilded the cage, a cage it will be if we barter our means of livelihood—the goodwill of our practices—however attractive the price which is offered to us (or will it be to our heirs, executors, and trustees?). As Englishmen whose forebears fought for liberty let us strike a blow at all this regulating of our lives by the State, a blow which will resound throughout the Empire; and let us roundly refuse even to discuss regulations aimed at shackling us to the chariots of the politicians.—I am, etc.,

Barnes. J. C. LYTH.

SIR,—My own part in the controversy over the National Health Service Bill has perforce been that of spectator, but having followed it carefully I have formed certain views from which the following emerge.

1. A democratically elected House of Commons with a full mandate, and having heard the views of all concerned, has decided that the Minister of Health has correctly assessed the public desire and in consequence has passed his Bill into law.

2. Many feel that this Act contravenes strongly held views among the medical profession. Now while it is our *right* as citizens to safeguard our own interests and our *duty* to express our opinions on the public welfare, we must be prepared to see our *advice* flouted, but we need not and must not allow our *interests* to be jeopardized without a struggle. Now that the Bill has been enacted we must make the best we can by negotiation to safeguard our own affairs, but we are no longer required to fight for the public aspects of the case because the public, through Parliament, has decided that our view of its welfare does not coincide with its own. Our duty to the public has been done to the best of our ability, and we can retire, I trust gracefully, from the stage.

3. As regards our own interests—do we advance these best by agreeing or by refusing to discuss with the Minister the details of the service which have yet to be defined before we can individually decide whether or no to enter it? The Minister, with his Bill passed, will be a very different person to deal with.

4. The advice showered upon us regarding the answer we shall give in the plebiscite has not, I feel, been devoid of much special pleading, a good deal of resentment at the Minister's methods in the pre-enactment stage, and a failure to set the issue against the proper background of economic facts and world trends in political and social affairs. To say "No" to entering a defined service is one thing, to say "No" to negotiating with a Minister of the Crown in the exercise of his statutory duty is something entirely different.

5. Dr. Dain talks of *insisting* "on our principles being established, by an amending Act *or whatever it may be* . . ." (italics mine). Now what House of Commons is going to bow to a demand of that sort? Especially one with a mandate as powerful as this House has. What, moreover, do the italicized words mean? Nothing; because an Act can only be amended by an Act, as of course Dr. Dain well knows. There is of course no semblance of an analogy with the N.H.I. controversy over the Spens Report.

6. In 1937 the Factories Act was passed. What should we have said, as trustees of much of the health of the country, if the employers or the unions had refused to discuss with the Secretary of State details of the countless statutory rules and orders which that Act entailed, simply because their personal views had been flouted or overridden by Parliament? What should we say to-day if employers or unions held up the work of the country because as a body they did not like the various Acts now affecting or about to affect coal, transport, and electricity?

I submit, Sir, that much bad advice is being given, and I fear it may result in effects far different to those envisaged and possibly very harmful to our profession and our prestige. I do beg our profession to lift its eyes from all that has been written of late about our "principles," from impressive voting figures at the Representative Meeting, and from its day-to-day preoccupations and anxieties, and to gaze for a moment at the far horizon. It stretches from Hiroshima to Lake Success, and the panorama is not such as to cause anyone to take a light-hearted view of the new world. Streams of lava are flowing from the political volcanos of the entire globe, and medicine has its great part to play in helping to direct the flow. Do we help best by accepting a democratically determined verdict we may not like or by putting ourselves out of step with the new life in our social and political structure?—I am, etc.,

Carbis Bay, Cornwall. L. P. LOCKHART.

Mr. Bevan and Ourselves

SIR,—Mr. Bevan has intimated to all who may be interested that he thinks that most doctors are honest. How much of this may be merely damning with faint praise is left to our imaginations. One has, however, always the impression that Mr. Bevan has a poor opinion of the general practitioner, and that when he himself has a cold and his self-prescribed remedies have failed he calls in some "deep-browed Homer" of consultant rank—nothing less. The amazing thing surely is that most doctors *are* honest considering the scurvy treatment which so many of them have had at the hands of successive Ministers of Health for so many years.

And what of the honesty of politicians? What of the shifts, subterfuges, and evasions, particularly of those of ministerial rank when they are asked a straightforward question? When the Minister of Labour was asked in the House the other day by a Socialist member whether the Government was in favour of a 40-hour week, it took ten lines in the *Daily Telegraph* to express what should have been a simple yes or no; and having read it no intelligent person could tell whether this circumlocutory effort was synonymous with yea or nay. This is a cynical form of verbal cleverness, of course, and the rafters must fairly ring when politicians fight their battles o'er again in those places where they forgather after "knocking off."

The doctor who practises "polypharmacy" (as is alleged) to win additional patients must really think of something more subtle, or the extent of his labours will probably not require even 40 hours a week for their execution.—I am, etc.,

Hove. G. L. DAVIES.

The Basic Salary

SIR,—On the matter of part-payment by basic salary, there is one point on which the public and the profession might properly require very explicit information before the National Health Service comes into being. The question is: "What is the precise nature of the new obligations which doctors are intended to undertake by accepting a salary in addition to full capitation fees?"

As I understand the N.H.I. capitation fee, it is meant to recompense a doctor completely for *all* his normal services to each panel patient. By accepting a patient's panel card and signing it, and by later receiving a capitation fee from the State, a doctor undertakes certain well-defined obligations towards each patient, which he discharges by the full and proper performance of his medical and other duties, including the issue of prescribed certificates. Similar and even greater obligations appear to be contemplated in the new scheme. If payment were to be by capitation fee alone for each patient on whose behalf such obligations were to be undertaken matters would remain much as at present under the N.H.I. All medical attention and other services to one's patients would be covered, including the issue of a variety of certificates, some of which are really prescriptions for money from the Treasury rather than medicines from the chemist, and some expressions of opinion.

When, however, part-payment by salary in addition to full capitation fees is proposed, one must consider what further obligations could be covered by the salary and to whom these would be due, since the capitation fee already covers all one's services to one's patients. If the capitation fee under the new scheme does not in fact cover every such service as before, then the public and the profession should insist on knowing in detail which services are covered by capitation fee and which by salary. It may be intended that the basic salary should be in addition to a full capitation fee for each patient. Then one would want to know on whose behalf the State was paying this extra money, for the State, as employer, seldom pays money for nothing.

In default of an answer we may be guided by the Lord Chancellor (*Journal*, Nov. 9, p. 714), where he is reported as having said that the success of the scheme depended in large measure on getting satisfactory certification [to stop abuses]; giving something in the way of salary would have been a very valuable thing. In other words "satisfactory certification" is so crucial to the Treasury that they are prepared to pay *double* for it—once by a full capitation fee which, at least under the N.H.I., covers the issue of all prescribed certificates, and a second time by a basic salary which is presumably meant to ensure that such certificates will be "satisfactory."

It will remain for each doctor before joining such a scheme to decide for himself whether he wishes to undertake any such new obligations, especially while they remain undefined. For by accepting a salary, however basic, in addition to a *full* capitation fee, such a doctor would in fact become an underpaid minor official of the Treasury, who undertakes to issue "satisfactory" certificates (i.e., to express "satisfactory" opinions), to remain a contented, uncritical member of the bureaucracy, to accept government by regulation without appeal to the law, to accept direction, grading, and the sack, and even—who knows?—a uniform white coat to wear in the health centre. Mr. Bevan is right enough to emphasize that such a doctor would not be a civil servant. No civil servant would even consider accepting such conditions of work for the amount of a basic salary.

I propose that if the plebiscite should show a majority of the profession to be in favour of entering into negotiations with a Minister who doesn't negotiate, then two points should be insisted upon: first, that these new obligations be precisely defined; secondly, that it should be optional for any doctor joining the scheme to decline the basic salary, and with it these new obligations to the Treasury which have not been needed under the N.H.I. scheme—I am, etc.,

Shere. G. I. WATSON.

The Negotiators

SIR,—While I am in favour of a negotiating committee entering into discussions with the Minister on the Regulations authorized by the National Health Service Act, I am extremely doubtful whether the present members of that committee are the right persons to negotiate.

I would suggest that, should the results of the present referendum show that a majority of the Association are in favour of continued negotiation, new members of the Council and of the Negotiating Committee should be elected. For the documents forwarded with the voting form make it clear that our present representatives hold views which are so inflexible as to make any form of negotiation impossible.

Should the majority of the Association vote against negotiation, it would seem reasonable to allow those members who are interested in maintaining a more co-operative attitude (despite any differences of opinion there may be between the Minister and themselves) to elect their own representatives. Those members of the B.M.A. who may wish to serve in the new National Health Service will naturally wish to negotiate; but it is senseless for them to be represented by a majority who have no intention of working in the new Service—I am, etc.,

London, N.W.3. B. DELISLE BURNS.

Pay of Pathologists and Bacteriologists

SIR,—For some years I have been puzzled by what seems to me one of the mysteries of our profession. I refer to the salaries paid to the junior pathologists and bacteriologists working in laboratories throughout the country.

In the first place, the word "junior" is a misnomer, since most of these men and women are doctors of experience in their specialty, and many hold higher degrees in their subject. Their salaries, however, have been at the lowest level for a very long time, and the young doctor who wishes to specialize in laboratory work finds himself forced to live somewhat precariously for many years. He is expected to do highly specialized work and to give advice to his far-better-paid brothers in practice; his daily routine is of necessity meticulous and painstaking, demanding a concentration and attention to detail second to none; the amount of study he has to do is enormous compared to, say, the general practitioner: for this he may be offered a salary of from £350 to £500 per annum.

It is only the few who eventually take charge of a laboratory who receive a financial return even remotely comparable to the earnings of the other branches of medicine. Yet the pathologist-bacteriologist is reckoned by most as a specialist; why then is he not paid as one? His work is recognized as essential in every community. Now, Sir, when a man's work becomes important he usually expects to be paid accordingly; it there-

fore seems odd that laboratory work constitutes the poorest branch of medicine.

I am a "laboratory doctor" because I find the work as interesting as the clinician finds his patient, but I object strenuously to a system which demands of me the highest efficiency in specialized work on the one hand, and on the other gives the practising clinician a comparatively comfortable life while forcing me literally to watch every penny. Such luxuries as a home of his own or a car are as a rule unknown to the laboratory doctor, while the activities of his wife and family are restricted in a way not usually associated with a specialist in our profession.

I should like to ask a question: Could the clinician and laboratory doctor change places? Well, in emergencies I have seen many laboratory doctors carry on medical practices and conduct them to the satisfaction of all concerned. I regret I have not witnessed the spectacle of a clinician or general practitioner faced with the histological diagnosis of a tumour, or the performance of a routine Wassermann test. In other words, is the laboratory doctor a specialist in the real sense of the word? If the answer is "Yes" then we have the strange position of a specialist receiving a salary about one quarter that earned by the non-specialist.

I regret, Sir, that for obvious reasons I must sign myself

LABORATORY DOCTOR.

Tetra-ethyl Lead Poisoning

SIR,—The article (Nov. 9, p. 581) entitled "Tetra-ethyl Lead Poisoning" by Dr. D. A. K. Cassells and Prof. E. C. Dodds leaves no doubt that organic lead had been inspired by all the cases. But in view of the known hazard I should like to know whether they underwent a preliminary physical examination; and more details about their personal protection would have been interesting—e.g., were they instructed to wash their hands after eating during the working shift, and were they forbidden to chew tobacco while engaged at their task?

While alcoholic poisoning is included in the differential diagnosis, the authors do not state whether the gas-free condition of the atmosphere in the petrol tanks was confirmed by tests. The wide range of urinary lead analysis—0.10 to 0.48 mg. per litre—can leave no doubt in the mind that the cases had been exposed to a particularly heavy lead exposure. But the leptomeningitis found at necropsy in Case 1, together with the very early onset of subjective symptoms in Case 4, are suggestive at least of industrial solvent poisoning. The absence of a basophilic response is to be expected, as the absorption of massive doses of the toxin over a short period of time would not allow an adequate haemopoietic stimulation.—I am, etc.,

Barnsley. D. G. ROBINSON.

Abacterial Pyuria

SIR,—I have followed with interest the recent correspondence in the *Journal* on abacterial pyuria. In particular, I was interested in the theories as to its causation. In one of the early articles a spirochaete was suggested as a possible causal agent. This was supported by the fact that neoarsphenamine, which has a dramatic curative effect in this disease, is also effective against many spirochaetes. One wonders whether penicillin, which is very effective in spirochaetal diseases, would have any influence on this condition. Should it do so, it would be further evidence in favour of this theory, as penicillin does not affect viruses or *Trichomonas vaginalis*, which have been suggested as alternative causes. So far as I know, there has been no mention of penicillin treatment in any of the published articles. I have not, as yet, had the good fortune to encounter this condition in general practice and so have had no chance to test this idea.—I am, etc.,

Croxley Green. D. P. WHEATLEY.

Abacterial Pyuria presenting as Urethritis

SIR,—With reference to Dr. R. T. Burkitt's letter (Oct. 26, p. 625) concerning my article on abacterial pyuria (Oct. 5, p. 493), I beg to submit the following reply. (1) The possibility of acid-fast infection was considered in all cases. The cases were discussed from this angle with a genito-urinary surgeon and a specialist physician who were both interested in this condition and had treated successfully with neoarsphenamine similar cases. Does pyuria, caused by an acid-fast infection, clear up dramatically and remain clear after N.A.B. injections? I would refer Dr. Burkitt to Mr. H. Donovan's article in the *British Medical Journal*, 1945, **2**, 12. (2) In the course of my tour of West Africa during the war I have found gonococcal cystitis *per se* a very rare condition indeed. The only cases of cystitis I have seen have been a basal type associated with acute prostatitis; but in the cases described in the article there was no evidence, on rectal examination, of prostatic involvement.

Perhaps I did not make it clear in the article, but the cases presented had no urethroscopic evidence of anterior urethritis. Cystitis of *Bact. coli* origin, for example, may present as a false urethritis—illustrated by the fact that a special treatment orderly of mine came to see me one morning, looking very puzzled, complaining of a urethral discharge associated with pyuria and frequency. He certainly had a purulent urethral discharge (pus cells + + +), but his correct diagnosis, confirmed by culture and cystoscopy, was *Bact. coli* cystitis.

Since arriving in Italy I have seen a further case very suggestive of abacterial pyuria, of which the following is the history:

The patient, a private soldier aged 28, with eight years' service, was admitted on Feb. 8, 1946, with what appeared to be a simple uncomplicated gonococcal urethritis. The urethral smear was positive for G.C. A routine course of 150,000 units of penicillin (5×30,000, two-hourly) was given. As the urine remained hazy a course of 30 g. of sulphathiazole was given over a period of six days. The anterior urethritis was cured, but the pyuria persisted. On Feb. 18 a further 150,000 units of penicillin was given, and, following a normal white cell count, a further course of sulphathiazole. On Feb. 25, as there was still no improvement in the condition of the urine (a mid-stream specimen on Feb. 20 revealed albumin +, pus cells + + +, R.B.C. + + +, epithelial cells +, casts nil, culture sterile), a pyrexial reaction was induced by intravenous T.A.B., but even this had no effect.

The case was first seen by me at this stage on March 1. On account of the persistent pyuria in spite of the above treatment, the marked frequency, the absence of prostatic involvement and of a true urethritis, and a negative Kahn, I treated the case with four injections of 0.3 g. N.A.B. on March 1, 3, 5, and 12. There was an immediate cessation of the almost intolerable frequency and a rapid clearing of the urine. On March 12 the urine was perfectly clear and the patient had no complaints. On a final examination at the end of March, prior to his release, he was in the best of health.—I am, etc.,

A. B. FIELDSEND,
Capt., R.A.M.C.

Breast Cancer Treated with Stilboestrol

SIR,—In May, 1946, I was asked to see a Mrs. X., aged 91 years, and found that she had a swelling in her left breast about the size of a large egg. It was hard, irregular, and caused puckering of the skin in front, but did not appear to be adherent behind. There was no doubt that it was a carcinoma. She refused to leave home to have any hospital treatment at her age, and so I started her on 3 mg. stilboestrol daily. Within a few weeks the breast commenced to soften and the swelling gradually diminished in size. When seen on Oct. 15 no swelling was visible on inspection, and only a small thickened area of breast tissue could be felt on palpation—about the size of a cob nut.

Apart from some deafness she is extremely well and active for her age.—I am, etc.,

Mecopham. W. D. HASLER.

Double Gastric Ulcer

SIR,—To Mr. M. Kaye's article on "Double Gastric Ulcer with Perforation and Haemorrhage" (Nov. 9, p. 695) we would add our observations on 5 established cases of double chronic peptic ulceration.

ABRIDGED CASE REPORTS

(1) A newspaperman aged 68 was sent in as a case of subacute intestinal obstruction. His presenting symptom was vomiting. Examination revealed epigastric rigidity. Past history strongly suggested chronic gastric ulcer. He was put on graduated ulcer

diet. A large haematemesis of 2 pints (1.1 litre) occurred 7 days later. A blood transfusion was given on usual indications and improvement followed only to be punctuated by another haematemesis. Investigations included test meal, which indicated high total acid. Radiography demonstrated an ulcer on lesser curve and a duodenal ulcer. Progress uneventful.

(2) A housewife aged 58 admitted on history of 7 days' weakness, melaena, and recent haematemesis. Past history pointed to symptoms of gastric ulcer dating from 1933. She had small repeated haematemeses, and response to transfusion was good. Radiography revealed two gastric ulcers. She was discharged in due course.

(3) A woman aged 70 was admitted as an "acute abdomen." Past history yielded vague dyspeptic symptoms culminating in an attack of upper abdominal pain associated with vomiting of two days' duration. Abdominal section showed blood-stained fluid and early peritonitis. On inspection of stomach a large prepyloric perforation below lesser curve was noted. Induration was a feature. On opening lesser sac a gastric mass posteriorly was attached to pancreas without obvious signs of malignancy. On separation, a larger ulcer presented. Ulcers were closed. Histological examination demonstrated chronic ulceration and ruled out neoplastic change. Condition on discharge was satisfactory.

(4) A middle-aged Chinese man was admitted with a diagnosis of pulmonary tuberculosis and died from this malady. At necropsy two chronic ulcers were found on lesser curve about 1 in. (2.5 cm.) apart.

(5) A man aged 69 was admitted with vague abdominal pain occurring mainly after meals, of several years' duration. Radiography one year previously had yielded negative results. Three days later he vomited three-quarters of a pint (430 ml.) of "coffee grounds" fluid. In spite of blood transfusion and other supporting measures he deteriorated rapidly and died. Necropsy findings—(*a*) Oesophagus: dilatation of lower end, with ulcer 3 cm. by 2 cm. immediately above ridge separating oesophagus from stomach. Base indurated and adherent to left lung. Floor of ulcer presented several small oozing points. (*b*) Stomach: ulcer 2.5 cm. by 2 cm. immediately distal to gastro-oesophageal ridge. Floor smooth and fibrotic.

This group of five cases is drawn from an ulcer case list numbering 100 per year approximately. The lesions were demonstrated radiographically (two), post mortem (two), and one at operation.—We are, etc.,

A. E. SHAW.
A. I. SUCHECKI.

St. Charles' Hospital, London.

Amoebiasis

SIR,—Correspondence on amoebiasis must come to you with a considerable time-lag, as those who contribute are usually remotely situated. Dr. M. L. Mason's letter (Aug. 31, p. 308) is eminently practical, and stresses aspects which are too often left unstressed and which are so important that I hope colleagues at home, unused to many peculiarities which the condition is apt to exhibit, will take his letter as a timely warning. The infective stage of the amoeba being the cyst adapted to withstand adverse conditions such as drought, gastric juice, etc., cyst-passers reaching the U.K. are liable to start the disease in its most active form over wide areas. Where rural sanitation still exists, this may be more than a possibility; where water sanitation obtains, there is no use expecting cysts to perish due to the anaerobic action of septic tanks and sewage systems; and there is always the house-fly. There is also the carrier who can infect food; I have often examined matter removed from under finger-nails and found cysts present. In view of the fact that the efficacy of treatment of amoebiasis still leaves much to be desired, even treated cases will have to be considered as potential carriers.

To comment on Dr. Mason's typing of symptomatology, I would say that diarrhoea is far from common, and may often be so slight that it is not remembered when, long afterwards, the patient shows symptoms suggesting chronic appendicitis or peptic ulcer. This type is very common, but I do feel that type 4, i.e., the malaise and irritability type, is by far the most frequent. Unfortunately, even if numerous specimens are examined, the stools are usually negative. This is probably because the amoeba is a commensal for quite lengthy periods, and has no need to encyst and find a new host. These negative results may mislead the inexperienced; also the repetition of tests takes up much time, whereas early diagnosis would enable the practitioner to notify his M.O.H. at least a week earlier, even supposing he were lucky enough to find one stool positive by ordinary straight examination. A practice of mine for the last eighteen years has been to give such cases one injection of 1/2 to 1 gr. (32 to 65 mg.) emetine, and examine the stools next morning. I have rarely failed to find cysts when this has been done. They are usually with only one or two nuclei, in other words, finding a new host in a hurry. The reason, of course, is elementary zoology—when conditions become unfavourable (for instance, due to emetine) cysts are formed and pass out to seek a more accommodating host. This provocative test is particularly useful in the chronic patient, whose stools will otherwise always be negative.—I am, etc.,

Arua, Uganda. A. FORBES BROWN.

"Analgesic" or "Anaesthetic"?

SIR,—Dr. J. N. Fell (Nov. 9, p. 711) objects to the use of the "ugly term analgesic," and while it is obvious that a distinction exists it is only one of degree. The term "analgesic" implies the loss of pain sensations only and "anaesthetic" the loss of all sensations. But I have found that there is an important difference. If chloroform is dropped continually on a mask over the mouth and nose of the patient, sensation of pain is very quickly lost, long before loss of consciousness, and it is well known that hearing may remain quite acute for a considerable time and the anaesthetist has to be careful not to discuss the patient's symptoms until anaesthesia is complete. While analgesia is rapidly produced, the auditory sense is the last to go. The object of the surgeon should be not only curative, but also the complete abolition of any pain. For instance, the removal of a gauze packing in an abdominal wound will cause very acute though temporary pain, which could be completely avoided by producing analgesia by dropping chloroform on a mask continually for one minute only. It was my custom to tell the patient that he or she would be quite aware of the withdrawal of the gauze packing but it would be quite painless, and it became my custom to go round the ward with a mask and a bottle of chloroform. The patient had absolutely no pain and no other symptoms of any kind. In one case a friend of mine whom I visited in the hospital had double pneumonia and was very seriously ill. He told me he had a raging toothache but was refused any anaesthetic owing to his condition. I gave him chloroform for one minute and then extracted the tooth quite painlessly.—I am, etc.,

Worthing. HERBERT H. BROWN.

Definition of Health

SIR,—I should like to endorse Dr. W. F. Felton's pertinent remarks (Oct. 19, p. 591) concerning the definition of health adopted by the World Health Organization. I have long believed that much confusion of thought and inadequacy of practice, especially in the realm of "social medicine," can be traced to the vagueness of our conception of health. I have pointed out elsewhere (*Medical Officer*, 1946, Mar. 30, p. 118) that in common speech we use "health" indiscriminately, both to refer to a specific ascertainable condition (e.g., he recovered his health) and also as though it were practically synonymous with "condition" itself. If the first is used it is by no means illogical to oppose health and disease, and to define each as the absence of the other. I therefore suggested that we should accustom ourselves to the wider use. This demands a qualifying adjective before it can be applied to particular cases (as good health, better health, indifferent health), and so the true antithesis of "good health" and "bad health" emerges. Disease is relegated to its proper place, which is that of one factor, a very variable one, in particular cases of poor health. Thus a mere grammatical exploration of the term does seem to me notably to clarify our thinking. May I add my own definition of health, which is, in its simplest form, "the total condition of the personality." This provides for the dynamic quality which Dr. Felton so rightly wishes to emphasize. Our aim would be that each individual might continually approach his "best possible" total condition. In this way, goal can move constantly ahead of achievement, and a real constructive "positive" outlook is assured.—I am, etc.,

Gravesend. HERBERT S. DAVIES.

Obituary

J. L. BROWNLIE, M.D., D.P.H., F.R.S.Ed.

Dr. James L. Brownlie, who died on Nov. 12 in Edinburgh, succeeded the late Dr. John Parlane Kinloch as chief medical officer of the Department of Health for Scotland in 1932 but resigned that post at the end of 1936 after being on sick leave for some time.

James Law Brownlie was a student of Glasgow University and graduated M.B., Ch.B., and five years later received high commendation for his M.D. thesis on the problem of the diphtheria carrier. He also took the Cambridge D.P.H., and during his tenure of office in Edinburgh received the diploma of M.R.C.P.Ed., and was elected F.R.S.Ed. He had been for four years resident medical officer at the Glasgow Corporation fever hospitals and for six years assistant bacteriologist in the Glasgow Corporation laboratory. During this part of his career he contributed papers to medical journals and became known as an investigator of food-borne infections. His next post was that of bacteriologist and pathologist for the County of Lanark. In 1930 he moved to Edinburgh to take up duty as a medical officer of the Department of Health for Scotland, and one of his main tasks was concerned with the co-ordination of the hospital services of Scotland; he also represented his Department on various scientific bodies and committees. Brownlie was honorary secretary of the Section of Micro-Biology (including Bacteriology) at the Annual Meeting of the B.M.A. held in Glasgow in 1922, and vice-president of the Section of Public Health when the Association met in Dublin in 1933.

Dr. JOHN WILLIAM LINDSAY, who died at his home in Ealing on Nov. 9, was a practitioner of the "covered-wagon" days in the cattle country of South America. He was born in Aberdeen, where he graduated M.A., M.B., Ch.B., gaining the medals in surgery and in obstetrics, and then joined the South American Missionary Society beginning pioneer medical work in the Paraguayan Gran Chaco in 1900. In 1902 he set up in private practice at Belén in eastern Paraguay, where, except for service in the R.A.M.C. on the western front during the 1914–18 war, he worked until his retirement to England in 1934. He quickly acquired a very great professional reputation, and it was not uncommon for patients to travel six weeks by bullock-cart to see him. In addition to frequent revolutions his locality provided all the excitements of "wild-west" frontier life and, though he was beloved by all, he narrowly escaped many a bullet. A deeply religious man with a strong evangelical leaning he built a local mission-hall, and among other attainments Dr. Lindsay had a knowledge of a dozen dialects and was early attracted to Guaraní, the language of an extinct race, in which, though it had not been reduced to writing, he published a translation of the New Testament which he had made from the original Greek. During the Gran Chaco war of 1932–4, he equipped and managed a military hospital for Paraguayan troops, did much to arouse interest in the work of the British Empire Leprosy Relief Association, and in the recent war worked with the Ministry of Economic Warfare as Spanish expert until his health broke down. He is survived by his wife and three children (one of them in the I.M.S.) who shared his South American adventures.

Dr. ALEXANDER MACINTYRE, of Airdrie, Lanarkshire, who died some weeks ago at the age of 67, was a native of the Strath of Gairloch, Wester Ross. He studied medicine at the University of Glasgow, graduating M.B., Ch.B. in 1902, and started work at Airdrie on the first day of 1903 as assistant to the late Dr. Gemmell, whom he succeeded. Apart from two and a half years of service as a medical officer with the Forces in the war of 1914–18 Dr. Macintyre spent all his medical career in that neighbourhood, where his skill and devotion won the regard of all his patients. He was particularly well versed in Gaelic tradition and lore, and a fluent speaker of the language; he helped to edit several Gaelic books. He was a life member of the Glasgow and Inverness Gaelic Society, and an address he gave in January, 1945, was so excellent in matter and manner that the Society had it printed and published in booklet form under the title *Home Culture*. He will be greatly missed not only by his own community but by a wide circle of friends and admirers of his scholarly mind. He had been a member of the B.M.A. since 1917.

Universities and Colleges

THE PLEBISCITE

Statement by Sir Alfred Webb-Johnson

The following statement was made by the President of the Royal College of Surgeons of England, Sir Alfred Webb-Johnson, at a meeting of plastic surgeons held at the College on Nov. 20.

"Every medical practitioner is being asked to give an answer to the following question: Do you wish the Negotiating Committee to enter into discussions with the Minister of Health on the regulations which he is authorized to make by the National Health Services Act? I hope that all practitioners will give this question most serious consideration. I trust that they will not lightly make it difficult for the responsible leaders of the profession to enter into negotiations in which the Minister is now at liberty to take part. It must be borne in mind that a vote in favour of discussions with the Minister does not register approval of the Act in every detail. A vote in favour of discussions does not commit any practitioner to accepting service under the Act. There are parts of the Act which, in the judgment of the majority of the profession, will not give the public the best service. But the Act probably pleases no one entirely. There are obvious dangers to be guarded against. Discussions will, however, provide opportunities for negotiation on many points which still need clarification, in spite of the debates in Parliament. They will also provide opportunities for helping to plan most of the machinery of the Service, and to mould much of the policy which remains to be settled by regulations."

UNIVERSITY OF LONDON

John McMichael, M.D., has been appointed to the University Chair of Medicine tenable at the British Postgraduate Medical School, from Oct. 1.

Stuart Dunsmore Elliott, M.D., has been appointed to the University Readership in Bacteriology tenable at the London Hospital Medical College, from Oct. 1.

The following candidates have been approved at the examination indicated:

THIRD M.B., B.S.—[15]P. J. Blaxland, [15]Patricia Chippindale, [14]A. T. Cook, [1346]J. A. Davis (University Medal), [12]F. V. Flynn, [15]Kathleen A. M. Frith, [16]D. W. S. Gordon, [15]A. J. Harrold, J. M. Alderton, Elizabeth J. Allday, R. H. Anthony, J. J. Ashken, M. Atkinson, D. A. Bailey, D. W. Bain, D. N. Balsekar, A. D. Bangham, P. J. Banks, G. F. Barnes, P. J. H. Barron, A. C. Barthels, D. Bartlett, H. N. Baylis, R. W. Bell, A. Benjamin, A. J. Berrill, M. A. Birnstingl, R. W. A. Bottoms, Daphne V. Bousfield, L. W. Bowen, A. C. Boyle, H. G. Broder, M. H. Brook, L. Brotmacher, E. K. Brownrigg, Brenda M. Buck, D. E. Burgess, G. L. Burgess, J. Candy, J. R. Carter, Rosemary Cartledge, C. L. Casimir, F. E. de W. Cayley, F. C. Chesterman, C. J. Christmas, Betty L. Coles, R. B. Coles, H. P. F. Corbin, Anne N. M. Crane, D. W. J. Cullingford, M. J. Cutler, D. G. L. Davies, P. R. Davis, A. J. A. Dawes, P. E. A. de Caestecker, J. F. de la Fresnaye, K. R. Dempster, H. S. de Silva, C. F. Donovan, D. M. D. Evans, M. E. Fearnley, B. R. Finlay, F. J. Fish, M. L. H. Flindt, A. F. Forbat, R. H. Fox, C. J. G. De L. Franklin, F. E. Fraser, J. G. Gant, Mary P. Gibson, C. E. J. Glaisher, H. H. Glatston, S. G. Gordon, Rosemary D. Graham, Helen C. Grant, G. R. Green, C. J. Griffin, G. L. Gryspeerdt, A. W. Hagger, G. J. L. Hamilton, N. Hamlin, J. Hankinson, R. P. Harwood, P. J. D. Heaf, I. T. T. Higgins, A. B. Hill, R. D. Hoare, R. K. Hollows, R. J. Howat, A. Hughes, R. W. Hughes, J. R. Ivey, I. Jaffa, G. V. Jaffé, J. James, J. G. Jamieson, C. W. L. Jones, D. W. W. Jones, K. C. D. Jones, T. G. Jones, P. Jordan, A. R. Kagan, I. A. Kellock, R. E. Kelly, Marjorie A. C. Kuck, M. Kugler, O. G. Lane, J. L. Lawrence, Wendy E. Lewington, Elaine Lister, G. H. Luffingham, J. Lustigman, K. A. McCluskey, I. J. MacDonald, H. W. Macintyre, I. Mackenzie, Freda S. Mackover, R. G. C. MacLaren, R. Macpherson, J. D. Manning, E. A. W. Marien, S. Mattingly, W. R. May, E. V. M. Medill, J. N. Mickerson, R. Moolan-Feroze, I. A. H. Munro, C. P. Newcombe, K. H. Nickol, C. Pearce, R. A. O'G. Pearson, J. H. Pendered, Thelma M. Phelps, B. H. Pickard, Jean Pickford, C. M. C. Potter, Prudence M. Proudlove, J. I. Pugh, J. H. Raphael, Eva M. Raybould, D. D. Rees, M. F. Rémy, D. I. Roberts, J. E. Russell, M. McC. Russell, A. J. Ruzicka, R. C. O. Saunders, Enid Scholfield, Valerie Scotland, A. G. Seaman, R. P. Shields, Patricia D. Shurly, N. R. W. Simpson, I. P. D. W. Skempton, P. A. J. Smith, R. J. H. Smith, J. L. Souster, M. J. Squires, R. J. Stanley, Dorothy M. Stanton, J. E. T. Strickland, M. Strode, Gwendolyn M. Sutton, G. F. Swann, C. K. M. Thacker, D. M. E. Thomas, I. J. Thomas, H. N. Waller, J. H. Wallis, R. G. Watson, B. G. Wells, J. Whitwell, W. B. Whowell, A. P. H. Wilkinson, J. R. B. Williams, Lorna E. Williams, T. B. Williamson, J. T. Woodall, Joan D. Wrigley, Angela R. Young, C. J. Zerny.

[1] With honours. [2] Distinction in pathology. [3] Distinction in hygiene and forensic medicine. [4] Distinction in medicine. [5] Distinction in surgery. [1] Distinction in obstetrics and gynaecology.

UNIVERSITY OF LEEDS

Digby Chamberlain, Ch.M., F.R.C.S., has been appointed Professor of Surgery in the University, from Oct. 1.

The title of Emeritus Professor has been conferred on William MacAdam, M.D., F.R.C.P. (professor of medicine), Peter Lindsay Sutherland, D.Sc., M.B. (professor of forensic medicine), and Charles Wilfred Vining, M.D., F.R.C.P. (professor of children's diseases).

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Meeting of Fellows and Members

At the annual meeting of Fellows and Members on Nov. 13 the President, Sir Alfred Webb-Johnson, Bt., presented the report of the Council. It was desired to create, under a new Charter, Faculties within the College, to elect to the Fellowship, each year, not more than four Members who had been practising dental surgery over a long period, and to grant a Fellowship in Dental Surgery. They were to be congratulated on securing the services of Prof. F. Wood Jones and two new curators for the anatomy department. The John Hunter medal and prize had been awarded to Dr. Joan Margaret Ross for her outstanding work in pathological anatomy. Two prizes of £1,000 each, the gift of Mr. Charles L. Mayer, of New York, had been awarded to Mr. Terence Millin in recognition of his contribution to the advancement of the surgical treatment of the prostate, and to Prof. E. C. Dodds for his researches in the field of the synthetic hormones.

The College and the National Health Service Act

The President added some remarks on the National Health Service Act. There was, he said, much good in the Act, and important concessions had been made by the Minister as a result of their representations. Nevertheless, a good deal of anxiety still prevailed. In fighting for the freedom of the profession they were not fighting for any vested interests, but for an essential freedom of the people. The Lord Chancellor had given the President assurance that specialists who did not join the service would have freedom in an honorary capacity to treat their private patients in hospital, and had accepted an amendment with that in view. He hoped that the Negotiating Committee would continue to enjoy the confidence of the profession.

Mr. C. E. Beare moved:

That this meeting of Fellows and Members of the Royal College of Surgeons urges the Council to do its utmost to prevent the penalization of private practice by the restriction of the medical staffs of hospitals to those who take part in the State Medical Service.

He expressed the gratitude of the Fellows and Members to the President and other members of Council who had served on the Negotiating Committee, but considered it not quite clear from the Lord Chancellor's assurance whether the reference was to specialists on the staffs of hospitals in an honorary capacity or to those who were in the Service. The President pointed out that the amendment accepted by the Government inserted the words "whether in an honorary or paid capacity," but Mr. Beare was still doubtful about the interpretation of this amendment. It was possible that those at present on the staffs of hospitals would not be re-elected unless they undertook State service, and he feared they might be debarred from attending private patients in these hospitals. Mr. Dickson Wright seconded the motion.

Dr. H. Guy Dain considered that the accepted amendment made very little difference, for the Minister had stated categorically that he would not allow any private practitioner who was not in the Service to practise in the State hospitals, and this referred not only to the public but to the private wards. If and when the State owned all the hospitals it would be the end of private specialist practice. It would be necessary to establish nursing homes outside the Service, and even then there was no guarantee that they would not be taken over. The President said that the Lord Chancellor's assurance, which had been confirmed by the Minister, must go some way to relieving anxiety, but he fully appreciated Mr. Beare's point, especially as it related not to those already in practice but to those coming into practice in the future and who did not comply. The Negotiating Committee should clear up the point.

On Mr. Beare's motion being put to the vote, twenty-six stood in favour of it, but this number was short of the quorum required under the rules of the College, and a special meeting of Fellows was called for Nov. 29.

At an ordinary meeting of the Council of the College, held on Nov. 14, with Sir Alfred Webb-Johnson, Bt., President, in the chair, the Honorary Gold Medal of the College was awarded to Sir Alexander Fleming, F.R.S., F.R.C.S., in appreciation of his distinguished work and particularly in recognition of his discovery of penicillin.

Prof. Ian Aird, F.R.C.S.Ed., professor of surgery at the British Postgraduate Medical School, was elected *ad eundem* to the Fellowship of the Royal College of Surgeons of England.

It was reported that the trustees of the Sir Halley Stewart Trust had made a grant to the College for a research fellowship, and Mr. H. Fletcher Lunn, anatomical curator, was appointed as the first Sir Halley Stewart Fellow. Mr. Alan C. Perry (London), Sir Heneage Ogilvie (Guy's), and Mr. R. M. Handfield-Jones (St. Mary's) were elected members of the Court of Examiners. Mr. R. J. Last, M.B., anatomical curator, was elected as the first Bland-Sutton Research Scholar. It was reported that the special trustees had elected Mr. F. H. Masina, F.R.C.S., as a Prophit Research Student for the investigation of the pathology and treatment of carcinoma of the bladder. The Hallett Prize was awarded to Mr. Robert Pope Melville, of the University of Sydney. Hugh Kelson Ford (Epsom College and the London Hospital) was nominated as the fifty-fourth Jenks Scholar.

Diplomas of membership were granted to the 114 successful candidates whose names appeared in the report of the meeting of the Royal College of Physicians of London as recipients of the Licentiate of that College (Nov. 23, p. 799).

Diplomas in Child Health, in Medical Radiotherapy, and in Medical Radio-Diagnosis were granted, jointly with the Royal College of Physicians of London, to the successful candidates whose names were included in the report of the meeting of that College.

The following lectures will be delivered at the College (Lincoln's Inn Fields, W.C.) at 5 p.m.: Dec. 5, Imperial Cancer Research Fund Lecture, by Dr. B. D. Pullinger, "Cystic Disease of the Breast: Human and Experimental." Dec. 12, Robert Jones Memorial Lecture, by Mr. W. Rowley Bristow, "Injuries of the Peripheral Nerves in two World Wars." Dec. 17, Erasmus Wilson Demonstrations, by Mr. R. W. Raven, "Melanoma and Related Tumours." Dec. 19, Thomas Vicary Lecture, by Dr. E. Ashworth Underwood, "Naval Medicine in the Ages of Elizabeth and John."

Medical Notes in Parliament

Welfare of the Deaf

Mr. KEY replied on Nov. 20 to a discussion on the welfare of the deaf. He said the Government recognized that, important as were hearing aids, the treatment of infectious diseases in childhood and prompt attention to the prevention of deafness were more important. The Ministry of Health was preparing comprehensive measures for prevention, diagnosis, and treatment of deafness as part of the National Health Service, and was armed with authoritative recommendations from those committees which the Medical Research Council had set up in 1944 at the request of the Departments concerned in this problem. There was not likely to be difficulty in persuading the Medical Research Council to undertake further research. By Section 16 of the National Health Service Act, the Minister himself had power to conduct or to assist by grants research into any matters relating to the causation, prevention, diagnosis, or treatment of illness. Deafness would be included in the provision, and the Department would use these new powers fully to see that such investigation was made. He did not suggest it would be possible to build up the complex organization for the care of the deaf and to have it operating everywhere by the date when the National Health Service Act would come into operation. But deafness clinics, under trained specialists, would be developed as part of the hospital and specialist services as quickly as available resources allowed. Up-to-date and effective means of testing deafness and of fitting the patient with the kind of aid which would benefit him would not be overlooked. An advisory committee on the welfare of the deaf would be set up when the time seemed ripe for it.

Mr. BEVAN stated on Nov. 21 that free issue of deaf aids could not begin before the National Health Service came into operation.

Streptomycin.—Mr. HERBERT MORRISON, on Nov. 18, said that the Medical Research Council had arranged for controlled clinical trials of streptomycin, as soon as supplies were available, to determine its value in tuberculosis and other conditions and the best methods for its use. Funds were being allocated for the cost of this work, including purchase of the necessary quantities of the product.

Dermatitis in Coal-miners.—Mr. DAVID GRIFFITHS asked on Nov. 19 for the numbers of cases certified by the certifying surgeons of coal-miners suffering from dermatitis from January, 1938, yearly up to and including December, 1945. Mr. JAMES GRIFFITHS explained that separate figures for coal-miners were not available, but the number of cases among miners generally, the majority of whom had been coal-miners, were as follows:

1938	..	254	1942	..	884
1939	..	305	1943	..	1,207
1940	..	402	1944	..	1,506
1941	..	573	1945	..	1,867

Staffing of Mental Hospitals.—Mr. BEVAN stated on Nov. 21 that during the past twelve months the accommodation in England and Wales for mental defectives had increased by 177 beds. On Jan. 1, 1946, mental hospitals were overcrowded to the extent of 13,176 patients, or 11.5% of the total accommodation. The number of nursing staff employed in mental hospitals and mental deficiency institutions had increased by 620 during the twelve months ended June 30, 1946, bringing the total to 25,840, just over half of whom were fully trained.

No. 45

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Nov. 9.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1946 (a)	(b)	(c)	(d)	(e)	1945 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	46	4	25	2	3	37	3	25	3	—
Deaths		—	—				—	1		
Diphtheria	314	20	88	30	6	573	39	157	77	24
Deaths	2	—	1		—	4	1	3	—	—
Dysentery	65	13	48	1	—	212	34	74	1	—
Deaths					—				1	—
Encephalitis lethargica, acute	2	1	1	—	—	—	—	1	1	—
Deaths		1					—			
Erysipelas			47	4	5			47	7	4
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				59					53	
Deaths	57	5	7		4	30	3	6	13	3
Measles*	3,987	157	231	65	23	445	23	89	112	3
Deaths	—	—	—		—	1	—	—	—	—
Ophthalmia neonatorum	57	7	24	1	—	54	4	6	—	—
Deaths										
Paratyphoid fever	30	2	1 (B)	1 (A)	—	5	—	4 (B)	—	—
Deaths	—	—	—		—	—	—	—	—	—
Pneumonia, influenzal	601	29	11	2	11	463	34	9	4	2
Deaths (from influenza)†	16	2	4		—	15	3	1	1	—
Pneumonia, primary			276	15				199	23	
Deaths		49			7		24		9	4
Polio-encephalitis, acute	1	—				3	—			
Deaths		—					—			
Poliomyelitis, acute	21	—	—	17	1	33	8	2	3	—
Deaths		1					—			
Puerperal fever		1	18		—		9	17		—
Deaths										
Puerperal pyrexia‡	125	10	13	—	—	136	7	11	—	1
Deaths		—					—			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,323	110	319	31	41	1,621	113	309	32	36
Deaths	2	—	—		—	—	—	—	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths					—				—	—
Typhoid fever	5	—	—	1	9	2	—	—	2	1
Deaths	1	—	—		—	—	—	—	—	—
Typhus fever	—	—	—	—	—	3	1	—	—	—
Deaths					—				—	—
Whooping-cough*	1,590	74	166	32	40	1,118	82	71	52	5
Deaths	8	—	2		3	7	2	1	1	—
Deaths (0–1 year)	382	43	78		21	276	30	49	45	16
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,729	742	643		135	4,053	639	535	192	101
Annual death rate (per 1,000 persons living)			14·2					12·1	12·4	
Live births	9,118	1425	1120		260	6,636	930	764	364	256
Annual rate per 1,000 persons living			22·5					15·3	23·5	
Stillbirths	262	26	45			190	24	29		
Rate per 1,000 total births (including stillborn)			39					37		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

It is still not possible to publish the return of births and deaths for Eire for the weeks ending Oct. 26, Nov. 2, and Nov. 9.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* infectious diseases were more prevalent during the week, and increases were recorded for cases of measles 613, scarlet fever 136, acute pneumonia 116, whooping-cough 41, and diphtheria 40. The only exception to the general trend was a fall in the incidence of paratyphoid 36.

The largest increases in the notifications of measles were Kent 160, Lancashire 102, and Northumberland 89; the largest decreases were Durham 74 and Middlesex 43. Cases of scarlet fever increased in number in most areas of the country, and notably in Middlesex 36 and Yorkshire West Riding 27. The only large variation in the trend of whooping-cough was a decrease in incidence in Lancashire 52. Notifications of diphtheria increased in Lancashire 34 and Northumberland 11 but fell in London 14. The 35 cases of diphtheria notified in Liverpool C.B. were a ninth of the total for the whole country. A new outbreak of dysentery, involving 11 persons, was reported from Southampton, Hartley Wintney R.D. The fall in the notifications of paratyphoid was due to the waning of the outbreak in Yorkshire West Riding; 16 further cases were reported in Sheffield C.B. during the week.

In *Scotland* the chief features of the returns were increases in the incidence of acute primary pneumonia 69, cerebrospinal fever 12, and dysentery 12. An increase in cases of pneumonia was reported from most areas of the country.

In *Eire* diphtheria notifications decreased by 17, while a rise was recorded for diarrhoea and enteritis 16, measles 11, and poliomyelitis 11. The 17 cases of poliomyelitis notified during the week involved twelve administrative areas in eight counties. The chief centre of infection is in County Cork, where in recent weeks 17 cases, with 3 deaths, have been reported. The rise in diarrhoea and enteritis was due to the experience of Dublin C.B., where the reported cases rose from 33 to 52.

In *Northern Ireland* the incidence of measles in the outbreak in Belfast C.B. declined by 9.

Week Ending November 16

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,293, whooping-cough 1,696, diphtheria 330, measles 4,382, acute pneumonia 625, cerebrospinal fever 30, dysentery 70, acute poliomyelitis 15, paratyphoid 26, typhoid 7.

Medical News

Abstracts of World Medicine and *Abstracts of World Surgery, Obstetrics and Gynaecology* will make their first appearance in January, 1947. These two new journals are being published monthly by the British Medical Association, the first at an annual subscription of 3 guineas and the second at 2 guineas. Applications for subscription should be sent to: The Publishing Manager, *British Medical Journal*, B.M.A. House, Tavistock Square, London, W.C.1.

A joint meeting of the Society of Public Analysts and other Analytical Chemists and the Food Group of the Society of Chemical Industry will be held at the Chemical Society's rooms, Burlington House, Piccadilly, W., on Wednesday, Dec. 4, at 6.30 p.m., when there will be a discussion on "The Application of Statistical Methods to Food Problems."

Dr. H. L. Marriott will deliver the Croonian Lectures on Tuesday, Dec. 3, and Thursday, Dec. 5, at 5 p.m., at the Royal College of Physicians of London, Pall Mall East, S.W.1. Subject: Some Quantitative Considerations Regarding Depletion of Tissue Fluid and Blood Constituents.

At a clinical meeting of the Medical Society of the L.C.C. Service at 3 p.m. on Thursday, Dec. 5, at the North Eastern Hospital, St. Ann's Road, South Tottenham, cases will be demonstrated in the wards, and Dr. E. H. Harries will give an address on "The Modern Fever Hospital."

The 254th meeting of the Biochemical Society will be held at the National Institute for Medical Research, Hampstead, N.W., on Friday, Dec. 6, at 1.30 p.m., when papers will be read.

Dr. Denis Williams will deliver a lecture on "The Clinical Use of the Electro-encephalogram" before the Whipps Cross Hospital Medical Society at the hospital on Friday, Dec. 6, at 8.30 p.m.

A Doctors' Messages Bureau has recently been set up in Liverpool. When a subscribing doctor is out it takes messages from his patients, and either relays them to an address given by the doctor or retains them until he telephones to notify his return home. Members of the staff are on duty day and night, and have had previous training as signal operators or receptionists.

A special open meeting, arranged by the Royal Anthropological Institute, will be held at the Royal Society's Rooms (Burlington House, Piccadilly, W.) on Tuesday, Dec. 3, at 5.30 p.m., when Prof. R. A. Fisher, F.R.S., will discuss "The Present Position of the Rhesus Blood Group Factor."

At a meeting of the London Association of the Medical Women's Federation in the Hastings Hall of B.M.A. House on Friday, Dec. 6, at 8.30 p.m., Dr. W. Ritchie Russell will speak on rehabilitation after head injuries. Coffee at 8.15 p.m. in the Common Room. Men and women guests invited. On Tuesday, Jan. 7, Dr. Innes Pearse will speak on the Peckham Health Centre.

The Benjamin Ward Richardson Lecture will be delivered at the Royal Sanitary Institute (90, Buckingham Palace Road, S.W.) by Prof. Harold Burrow on Wednesday, Dec. 11, at 2.30 p.m. His subject is "Future Control of Abattoirs and Knacker Yards."

On Nov. 18 a deputation representing all sections of the medical profession in Scotland submitted their views on the National Health Service (Scotland) Bill to the Secretary of State for Scotland, Mr. Joseph Westwood, M.P., at a conference held in St. Andrew's House, Edinburgh. Dr. Wilkie Millar, former chairman of the Scottish Committee of the British Medical Association, led the deputation, and Mr. Westwood promised to consider the points raised. Some time ago he agreed to meet representatives as soon as the Bill was published. Later, the Secretary of State met representatives of the British Hospitals Association, and on hearing their views he gave a similar undertaking.

The Canada Club last week held a dinner in honour of Mr. Norman Robertson, High Commissioner for Canada, Lord Greenwood being in the Chair. Among those present were the following members of the medical profession: The Rt. Hon. The Viscount Addison, Sir Wilson Jameson, Dr. P. L. Backus, Mr. J. Lyle Cameron, Dr. Hugh Clegg, Dr. J. R. M. Collie, Dr. H. Neil Collier, Dr. T. F. Cotton, Dr. T. M. Creighton, Dr. H. A. C. Gregory, Dr. A. Livingstone Johnson, Dr. P. A. H. King, Dr. I. D. MacDonald, Dr. R. S. MacLatchy, Mr. Rodney Maingot, Dr. F. H. Mather, Dr. Donald Paterson, Dr. Clarence Routley, Dr. Clive Shields, Dr. Leo Zealand.

The Minister of Labour and National Service, on Nov. 13, inspected one of the mobile exhibition vans which is to be used in the forthcoming recruitment campaign for nurses. The vans will visit villages and smaller towns and will be staffed by technical nursing officers of the Ministry who will co-operate with local hospitals in the areas visited. During the next month a tour will be made of the Southern and South-western Regions in the neighbourhood of Reading and Salisbury.

At a special general meeting of members and honorary members of the Victor Chetwynd Tuberculosis Fund for Allied Ex-Service Men on Oct. 23 it was reluctantly decided to close down the Fund. Applications had been made to various Ministries for official recognition but without avail, consequently the financial support necessary for the Fund's operations had not been forthcoming. The tragic death of the Foundress, Lady (V.B.) Chetwynd, in the air disaster at Le Bourget on Sept. 4 had a serious repercussion on the Fund to which she had devoted so much time and energy.

The Department of Scientific and Industrial Research is sending a team to the Antarctic, under the leadership of Dr. R. A. M. Case, to study the possibilities of using lean whale meat for human food. The proteins of whale meat are believed to be of exceptional value for growth in comparison with the meat proteins of land mammals. Problems of selection, transport, and storage of the meat will be investigated. The expedition, which has been made possible by the collaboration of United Whalers, set sail a month ago in the new factory ship "Balaena."

It has been agreed by the Court of Governors of St. Peter's Hospital for Stone, Henrietta Street, W.C., that the title assistant surgeon to this hospital be abolished and in future all the honorary surgical staff be entitled honorary surgeons.

The Anaesthetics Committee, jointly appointed by the Medical Research Council and the Royal Society of Medicine, has been reconstituted with the following membership: Dr. C. F. Hadfield (Chairman), Prof. F. H. Bentley, Dr. C. Langton Hewer, Mr. R. Vaughan Hudson, Dr. H. King, Prof. R. R. Macintosh, Dr. F. C. MacIntosh, Dr. M. D. Nosworthy, and Dr. G. S. W. Organe (Secretary).

The Department of Ophthalmology of the George Washington University School of Medicine, Washington, D.C., U.S.A., announces that the tenth annual postgraduate course in ocular surgery, pathology, and orthoptics will be given from Jan. 27 to Feb. 1, 1947, and that the William Thornwall Davis intensive postgraduate course in ophthalmology will be resumed during the week Feb. 3 to 8, 1947, when subjects of clinical interest to the practising physician doing eye work will be presented. Further details of the two courses may be had on application to the secretary, Suite 34, 1801, K. Street, N.W. Washington 6, D.C., U.S.A.

Letters, Notes, and Answers

All communications with regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1. TELEPHONE: EUSTON 2111. TELEGRAMS: *Aitiology, Westcent, London*. ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

ANY QUESTIONS?

Massive Doses of Penicillin

Q.—*A recent brochure states that 500,000 units of penicillin given intramuscularly to the ambulant case maintains an "effective blood level" for eight to ten hours, and suggests that this dose might be injected every twenty-four hours, or a dose of 200,000 units every twelve hours. This would appear to be in conflict with the findings of Fleming, Young, Suchet, and Rowe (see "Pharmacology of Penicillin" by L. P. Garrod). To quote Garrod: "It is clear that dose and duration of effect are not directly proportioned . . . the greater the magnitude of the dose the less is the prolongation achieved by any given addition to it. . . ." Which of these views is correct?*

A.—This is an exceedingly important question at the present time, since the "massive dose" system is being increasingly resorted to in order to facilitate the treatment of ambulant patients, both in general practice and in the out-patient departments of hospitals. The facts are as stated in the *Pharmacology of Penicillin*. A blood penicillin level sufficient to inhibit the growth of the standard staphylococcus was found by McAdam *et al.* (*Lancet*, 1944, **2**, 336) to last for between one and two hours after doses of 10,000 and 15,000 units; for between two and three hours after 25,000 or 50,000 units; and for rather over three hours after 100,000 units. We know of no comparative published data for larger doses than this, but in a recent personal observation a dose of 250,000 units produced a bacteriostatic blood level up to the fourth hour but not the fifth. It is quite clear that doubling this dose would not be expected to double the duration of effect.

Whatever precise figures be accepted, it is common ground between the advocates of massive infrequent doses and anyone who may oppose this policy that the patient so treated has insufficient penicillin in his blood for a substantial period before the next dose is due—actually for well over half the interval between doses if the doses mentioned are given. The system is also unquestionably extravagant. Against this is to be set the advantage of the exceedingly high concentration attained in the blood shortly after the massive dose is injected. This is said to promote diffusion from the blood into the infected area. It will certainly do so if active exudation is going on. Florey, M. E., Turton, E. C., and Duthie, E. S. (*Lancet*, 1946, **2**, 405) have found that after an intramuscular dose of 100,000 units penicillin can be detected in the exudate of a wound for eight, and sometimes for twelve, hours. Whether the same result would follow in a closed lesion into which exudation is less profuse is doubtful. The respective advantages of the wide fluctuations in blood level produced by injections given even at three-hourly intervals and the low but constantly adequate level resulting from continuous infusion are still unsettled. Whether doses given only twice or even only once a day are effective is a question which could be studied by animal experiment, but before such a policy is finally accepted it should also be submitted to the most careful clinical study. Such studies, so far as we are aware, have not yet been reported.

Car Sickness in Children

Q.—*What is the best prophylactic treatment for travel sickness in a child aged 6 during a journey by car?*

A.—In the long run, getting used to the mode of travel seems the only satisfactory remedy. Many children are very

sick when they first begin to make car journeys and then appear to get over the trouble. If it is at all persistent, careful examination of the eyes should be made and refractive errors corrected. There does seem to be a visual factor in some instances, and the child is better sitting high up to get an unrestricted field of vision. Some children are helped by sugar. Before the war a well-known brand of glucose (and sodium bicarbonate) tablet was found useful by many parents, but it is unobtainable now. Personal points permitting, plain boiled sweets might be prescribed instead and sucked throughout the journey.

Dental Anaesthesia after Coronary Disease

Q.—*A man of 47 recently recovered from an attack of coronary thrombosis. He must now have all his teeth extracted, and the condition of his gums precludes the use of a local analgesic. What general anaesthetic should I advise?*

A.—As the man has recovered, the anaesthetic risk is scarcely greater than normal. Nasal nitrous oxide–air or nitrous oxide–oxygen would be suitable. If anginal symptoms are present it would be wise to ensure a smooth anaesthesia by injecting just sufficient thiopentone to abolish consciousness. The patient should be sitting in the dental chair with the mouth prop already in place, and the anaesthetic should then be continued with nasal nitrous oxide–oxygen in the usual way. In this particular case the patient should also rest for half an hour to an hour before going home.

Intestinal Parasites in Dogs and Children

Q.—*A seemingly healthy dog, in spite of treatment, continues to pass from time to time scattered, living, single segments of tapeworm. Is there any risk to children living in the same house?*

A.—The tapeworm segments are probably those of *Dipylidium caninum*, a common intestinal parasite of dogs and cats. The infection is acquired only through the ingestion of adult fleas or dog lice (*Trichodectes canis*) containing the larval form of the tapeworm. Because of this method of transmission, human infections are relatively rare and mainly occur in children. In the event of such infection the proglottids will first appear in the child's faeces some three to five weeks after the ingestion of the infected insect.

Pantothenic Acid

Q.—*Pantothenic acid is said to be a cure for "burning feet" and "jittery legs." What is the dose and in what form is it prescribed?*

A.—"Burning feet" and "jittery legs" are stated to be symptoms of vitamin B deficiency, but it is not certain which component of the vitamin B complex is responsible, although riboflavin, nicotinic acid, and pantothenic acid have been suggested. Pantothenic acid can be administered in the form of a powder in doses of 20 to 100 mg. a day. It may also be administered parenterally in doses of 100 mg. So far as is known it is not harmful in these doses. Dogs and monkeys will tolerate a dose of 1 g. per kg. of body weight over a long period.

Treatment of Tetanus

Q.—*Would you discuss the value of curare, spinal analgesia, injections of magnesium sulphate, the sulphonamides, and penicillin in the treatment of tetanus?*

A.—During the last eighty years curare was used from time to time in treating cases of tetanus, but it was always difficult to assess the right dose. Some preparations were liable to give rise to respiratory spasm, which is extremely dangerous in tetanus. Now that standardized preparations of curarine are available they can be used with caution for controlling the spasm, but this treatment is still in the experimental stage. It should be remembered that treatment with curarine is only symptomatic, and does not affect the course of the disease except in so far as it prevents exhaustion. Even if the spasms could be completely controlled throughout the disease the patient would still die if a lethal dose of toxin had reached the nervous system. The problem of the use of curare and curarine in tetanus might be well worth considering in an academic discussion.

A spinal analgesic is better avoided in tetanus because of the difficulties of lumbar puncture and its liability to excite reflex spasms. General muscular spasms and convulsions are better controlled by basal anaesthesia, intramuscular paraldehyde, or paraldehyde or avertin given rectally.

Injections into the muscles of concentrated solutions of magnesium sulphate for the prevention of spasms have been abandoned because spasm is better controlled by modern sedatives. Sulphonamide and penicillin therapy are of value in preventing tetanus in so far as they prevent infection in wounds and therefore limit the production of tetanus toxin. There is no trustworthy evidence that the sulphonamides or penicillin have any effect on the actual toxin once it is producing its effect on the nervous system, or that the course of the disease in carefully controlled cases is modified. Sulphonamides and penicillin have a use in preventing coincident infections, such as pneumonia, developing during the course of tetanus. As this is a real danger in severe cases both may be worth a trial.

Effect of Pus on Sulphonamide Activity

Q.—*Is it correct to say that no sulphonamide has any action in the presence of pus, or are there exceptions to this generalization?*

A.—The bacteriostatic activity of most sulphonamides is much interfered with by the tissue breakdown products in pus. It is not entirely abolished, but it is so diminished that only highly sensitive organisms are affected. Thus it has been found that under otherwise favourable conditions—notably in accessible superficial infections, as in the case of infected burns—treatment with sulphonamide powder will usually suppress haemolytic streptococci, which are the most sulphonamide-sensitive bacteria concerned in sepsis, but other species are little affected. The only exception to this statement is "marfanil" (*p*-sulphonamidobenzylamine), the activity of which is unimpaired by pus. The efficacy of local treatment with this compound has not yet been adequately studied.

Pseudo-hypertrophic Muscular Paralysis

Q.—*What treatment do you advise for a child of 2 years with pseudo-hypertrophic muscular paralysis?*

A.—The only treatment which has been shown to have any effect in muscular dystrophies is glycine, of which 10 g. daily would be a suitable dose for a child of this age. On this treatment there is temporary improvement in 50% of cases and occasionally prolonged arrest of the condition. Sometimes, however, when glycine has been given its discontinuance is followed by a deterioration which is more rapid than was the course of the disease before treatment. Glycine appears to be more effective in females than in males. Vitamin E is of no value.

Amphetamine Sulphate in Narcolepsy

Q.—*How is amphetamine sulphate used in a case of narcolepsy with cataplexy?*

A.—Amphetamine sulphate is given in doses of 5 to 10 mg. several times a day, as may be necessary, to control the sleepiness and cataplectic attacks. The last dose should not be given later than tea-time in order to avoid interfering with nocturnal sleep.

Oestrogens at the Menopause

Q.—*Has stilboestrol in a dosage of 1 mg. three times a day always the effect of making a menopausal patient sick?*

A.—Stilboestrol often causes nausea and vomiting, but provided it is given in reasonable dosage it more often does not. The occurrence of such toxic symptoms during oestrogen therapy depends on several factors: (1) Individual idiosyncrasies. (2) The sex of the recipient, men being much less susceptible than women. (3) The age and physiological condition of the woman receiving treatment. Young girls generally tolerate it well whereas women of menopausal age are especially sensitive. During pregnancy, and usually during the puerperium as well, oestrogens never cause vomiting even if administered in large doses. (4) The type of preparation used and its dose. There is some evidence that in non-pregnant women at any rate

the more potent the preparation the more likely it is to cause vomiting. The synthetic oestrogens, and especially stilboestrol, are very prone to produce toxic effects. Natural oestrogens, such as oestradiol and oestrone, practically never give rise to untoward symptoms. If synthetic oestrogens are to be used, substitutes for stilboestrol are hexoestrol and dienoestrol, both of which are less liable to produce vomiting. If these are not satisfactory then natural oestrogens should be employed.

For the treatment of menopausal symptoms, however, 1 mg. of stilboestrol three times a day is far too big a dose, and apart from causing vomiting it will have other undesirable effects, such as the production of endometrial hyperplasia and heavy uterine haemorrhage, etc. Given preferably in divided doses of 0.25 mg. or 0.5 mg. a day should be quite adequate—indeed there is much to be said for using small amounts of natural oestrogens rather than synthetic products. In either case the dose has to be carefully controlled and varied, and for the details reference should be made to replies to questions in the *Journal* (1944, **1**, 171; 1945, **2**, 35; 1945, **2**, 307) or to *Gynaecological Endocrinology for the Practitioner* by P. M. F. Bishop (1946, E. & S. Livingstone, Ltd., Edinburgh).

INCOME TAX

Retirement on Falling Income

"CONSULTANT" points out that if he retires by gradually reducing his work the fact that his earnings will be assessable on the basis of the previous year means that he will during such a period be assessed each year on a greater amount of income than he is actually making. He asks whether there is any possibility of getting his "assessment based on the actual income of the year in which the tax is payable."

⁂ Tax on such earnings is payable half in the January of the year of assessment and the balance in the following July; we assume that "Consultant's" inquiry is directed to reconciling these two payments with the profits of the year of assessment. There are two possibilities which should be considered. (*a*) If the actual earned income is not more than four-fifths of the earned income on which tax is payable a claim can be made for such an adjustment as will result in tax being payable on the actual earned income. But there is an important condition attached to this concession—i.e., that the fall in the income must be due directly or indirectly to the war. Possibly the contention that gradual retirement had been hastened by war strain might suffice. Also the relief has been given for the recent and present year but may not apply to future years. (*b*) On complete cessation of work "Consultant" will be entitled to have the tax payable for the financial year in which he retires adjusted to the tax on his actual profits of that year—e.g., if he gives up practising as from Dec. 31, 1947, the assessment for the nine months April-December, 1947, could be reduced to nine-twelfths of his earnings for the year to Dec. 31, 1947.

Cost of Typewriter

C. D. is serving with the R.A.M.C. He has bought a second-hand typewriter and expects to sell it and buy a new model next spring, by which time he will be demobilized. Similar transactions will be effected as regards provision of a car. What can he claim?

⁂ In the first place it is most unlikely that the income tax assessing authorities could be persuaded that either the typewriter or the car is "necessary" in the performance of C. D.'s duties in the R.A.M.C., and no allowance will accordingly be made against his Army pay. When he resumes civil practice he will be entitled to depreciation allowance in respect of the car (an initial allowance if the car is bought after resumption) but not in respect of the typewriter—typewriters being regarded as "implements, utensils, or articles employed for the purposes of the profession" rather than "machinery or plant."

Deduction for Use of Premises

A. B. occupies large premises which were formerly used as a nursing home. Several of the rooms are not even in occasional use. The inspector of taxes claims to reduce the proportion of the rent or annual value regarded as applicable to the professional use of the premises from one-half to one-third.

⁂ Prima facie A. B. seems to be justified in pressing for allowance of one-half. The basic question is not what floor-space is available for the two respective purposes but what is a fair division of the rental, having regard to the relative advantages of the premises residentially and for professional use. Further representations might be made to the inspector of taxes coupled with an intimation that if the old ratio is disturbed the point will be taken to appeal before the District Commissioners.

LETTERS, NOTES, ETC.

International Association of Hospital Librarians

The International Guild of Hospital Librarians held its first conference in Paris in 1936, its second and last in Berne in 1938. A third conference was planned for London in 1940 but never took place. It will be remembered that in 1936 there was no very definite organization of the International Guild, which consisted mainly of individual subscribers and of two national sections—the British and the French. The Order of St. John in Jerusalem and the British Red Cross Society have now formed a joint committee to administer certain funds which remain as a result of collections made during the war. This joint committee has lately taken over the Hospital Library Department of the Red Cross and St. John and it also publishes a bulletin. Meanwhile, the Guild of Hospital Librarians, whose membership is now purely British, continues its work and publishes the *Book Trolley*. From letters and personal contacts it is clear that an exchange of information and suggestions would be widely welcomed. There still seems to be a need for a forum open to all concerned. Mrs. M. E. Roberts, hon. sec. of the former I.G.H.L., is anxious to get in touch with hospital librarians, doctors, and others who are interested, either by personal contact in London or by correspondence, which should be addressed to the International Association of Hospital Librarians, British Medical Association House, Tavistock Square, London, W.C.1.

Blanching and Blushing Baby

Dr. MYLES SHELLY (Waterford) sends the following query: I delivered a female child eight weeks ago. It was an easy low forceps delivery with no pressure marks of any sort on baby. The day after delivery the nurse in charge drew my attention to the following facts: (1) When the child was on its back it appeared quite normal. (2) On turning the child on either side, within a few seconds the uppermost half of its body from its scalp to a point just below its xiphisternum became quite blanched, while the side on which the child was lying became engorged and scarlet in colour, the midline of the upper half of the body being the definite line of demarcation. No respiratory or cardiac distress was noticed in whichever position the child was laid. (3) When the child was laid on its back the colour became normal again within a few seconds. The child's heart and lungs were investigated by four other doctors as well as chest *x*-ray, but nothing abnormal could be found. The child now being eight weeks old, these phenomena have completely disappeared. I would be very glad of an opinion as to the possible cause.

Antimalarial Drugs

Dr. RYAN MACMAHON (Chobham) writes: The answer to Dr. C. S. P. Hamilton's query (Oct. 26, p. 638) may be discoverable in the fact that numerous drugs and substances are not up to sample—e.g., an airtight tin of pyrethrum powder, used for experimental purposes, gave me such excellent results that it was found possible to dispense with mosquito nets; elsewhere pyrethrum powder was denounced as worthless. The explanation in this case was that the latter powder had been stored in open drums and sacks, and had thereby lost its efficacy. Similarly, certain antimalarial drugs have fallen into disfavour because their wartime substitutes have been inferior imitations. Dr. Hamilton's remark that antimalarial "results differ so much in different countries, and even zones" goes far towards answering his own question.

Varicose Veins

Dr. SARA FIELD-RICHARDS (Freshford) writes: I am delighted to see that at last attention has been drawn to the immense importance of varicosities to the community. Mr. Rowden Foote (Nov. 2, p. 680) calls attention to the fact that 10% of the hospital admissions throughout the war were due to this prevalent disease. It was not war injuries and the common ailments of mankind with which our hospitals had mostly to contend, but with this much neglected condition of varix. Anyone who, like myself, has been in general practice for many years and has realized that 10% of my patients suffered from a varicose condition, either minor or major, must appreciate how totally inadequate hospital arrangements are for their specialized treatment. I hope Mr. Foote's letter will do some good to the community in calling the attention of hospital administration to the crying need for specialized clinics.

Correction

Dr. D. E. SANDS writes: I regret to state that owing to a typing error the word "psychotic" has been wrongly inserted instead of "psychiatric" in line 12 of my letter in the *Journal* of Nov. 23 (p. 793). Since such a word makes no kind of sense with the preceding lines I shall be very grateful if you are able to publish a correction.